

# **A Response to the Secretarial Initiatives on Chemical and Radiological Vulnerabilities: Year End Progress Report**

**Paducah Gaseous Diffusion Plant  
Lockheed Martin Energy Systems, Inc.**

**DECEMBER 5, 1997**

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Vulnerabilities: Year End Progress Report**

**Paducah Gaseous Diffusion Plant  
Lockheed Martin Energy Systems, Inc.**

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**ACRONYMS, ABBREVIATIONS, AND INITIALISMS**

ANSI	American National Standards Institute
AOC	Area of Concern
BLTR	Baseline Training Requirements
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulation
CHP	Chemical Hygiene Plan
CNF	Central Neutralization Facility
COE	Corps of Engineers
D&D	Decontamination and Decommissioning
DOE	U. S. Department of Energy
DOT	U. S. Department of Transportation
EH	DOE Office of Environment, Safety, and Health
EMEF	Environmental Management Enrichment Facilities
EPA	U. S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ES&H	Environment, Safety, and Health
ESAMS	Energy Systems Action Management System
ETTP	East Tennessee Technology Park (formerly the K-25 Site)
EWP	Enhanced Work Planning
FFA	Federal Facility Agreement
FY	Fiscal Year
GET	General Employee Training
HAZMAT	Hazardous Material
HAZWOPER	Hazardous Waste Operations and Emergency Response
HMIS	Hazardous Materials Inventory System
HQ	DOE Headquarters
HSWA	Hazardous Waste Management Permit
ISMS	Integrated Safety Management System
JHA	Job Hazard Analysis
KOW	Kentucky Ordinance Works
LMES	Lockheed Martin Energy Systems, Inc.
LMUS	Lockheed Martin Utility Services, Inc.
M&I	Management and Integration
MK-F	MK-Ferguson
MSDS	Material Safety Data Sheet
NCS	Nuclear Criticality Safety
NEPA	National Environmental Policy Act
NMC&A	Nuclear Material Control and Accountability
NPL	National Priorities List

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**Response to Secretarial Initiatives**

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ORNL	Oak Ridge National Laboratory
ORO	DOE Oak Ridge Operations Office
ORPS	Occurrence Reporting and Processing System
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Act
OU	Operational Unit
PAAA	Price-Anderson Amendments Act
PCB	Polychlorinated Biphenyl
PGDP	Paducah Gaseous Diffusion Plant
PORTS	Portsmouth Gaseous Diffusion Plant
PRF	Plutonium Reclamation Facility
PSM	Process Safety Management
PSS	Plant Shift Superintendent
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RMP	Risk Management Program
S&M	Surveillance and Maintenance
SAB	Safety Authorization Basis
SAR	Safety Analysis Report
SWMU	Solid Waste Management Unit
Tc-99	Technetium
TCE	Trichloroethylene
TQ	Threshold Quantity
TSCA	Toxic Substance Control Act
TSCAI	Toxic Substance Control Act Incinerator
TVA	Tennessee Valley Authority
USEC	United States Enrichment Corporation
USQD	Unreviewed Safety Question Determination
VPP	Voluntary Protection Program
WAC	Waste Acceptance Criteria
WAG	Waste Area Group
WKWMA	West Kentucky Wildlife Management Area
WITS	Waste Information and Tracking System
WMIS	Waste Management Information System
WPPIS	Work Planning and Permit Information System
WSS	Work Smart Standard



## EXECUTIVE SUMMARY

On May 14, 1997, an explosion occurred in the Chemical Preparation Room of the Plutonium Reclamation Facility (PRF) at Hanford's Plutonium Finishing Plant. PRF has been shut down for several years and will be deactivated in preparation for decontamination and decommissioning (D&D). The explosion occurred in a room where nonradioactive bulk chemicals were mixed to support a now discontinued process. A spontaneous reaction of hydroxylamine-nitrate and nitric acid mixture was the cause of the explosion.

As a result of this incident, Secretary of Energy Federico Peña issued a directive to all Department of Energy (DOE) facilities on August 4, 1997, to conduct a broad initiative aimed at preventing similar occurrences at other DOE facilities. This directive contains four specific initiatives that address (1) the use, storage, and disposal of chemicals and waste; (2) known vulnerabilities; (3) the technical competence of staff; and (4) the lessons learned and occurrence reporting system.

Each of these Secretarial initiatives are addressed in this report. Evaluation criteria provided by the DOE-Oak Ridge Operations Office (ORO) were considered and very closely followed in developing the response. The approach used for the first initiative was to assess and evaluate existing management systems in use at the Paducah Gaseous Diffusion Plant (PGDP) Lockheed Martin Energy Systems, Inc. (LMES) to handle, store, and dispose of hazardous waste and materials. To facilitate this objective, a series of facility assessments and walkdowns was performed to validate the effectiveness of the existing systems as well as identify any vulnerabilities that had not already been identified. Special emphasis was given to site operations (formerly waste management operations). This evaluation found that existing management systems were functioning as intended and that an on-going effort is underway to assess previously-identified uncertainties associated with long-term storage of waste, particularly characterization data for legacy waste and associated waste container storage issues. From this effort, additional action items, such as development of the waste management risk-based strategy for waste disposition, will be prompted to fully understand potential vulnerabilities.

Additional information included in this report which addresses the September 1997 PGDP LMES incident involving an overpacked drum of acid waste. Details of the Type B Investigation Team Report will become available upon release of the report in early December.

The approach used to address the second initiative was to reevaluate the corrective action status of vulnerabilities identified in previous assessments. Examples of assessments reviewed included the Chemical Vulnerability Assessment, the self-assessment conducted as a result of the TOMSK chemical accident in the former Soviet Union, and Defense Nuclear Facilities

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## Response to Secretarial Initiatives

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Safety Board recommendations. Corrective actions, where applicable, were found to be complete. The systems used to prevent and identify new vulnerabilities relative to chemical and radiological safety are numerous and are closely related to the principles and functions of an integrated safety management system.

As requested by DOE-ORO, the response to the third and forth initiatives were combined for the three main Environmental Management and Enrichment Facilities business unit facilities [PGDP, East Tennessee Technology Park (ETTP), and Portsmouth Gaseous Diffusion Plant (PORTS)] because the processes used at each of these facilities are very similar. Teams of subject matter experts from each of the sites and the central organizations worked together to provide program descriptions and assess site and company-level training, lessons learned, and occurrence reporting systems.

The technical competence of the staff to identify and respond to chemical and radiological vulnerabilities is ensured through numerous general employee, job-specific, and facility-specific training programs and experience, education, and professional certifications. The occurrence reporting and lessons learned programs at each site are systems used to ensure potential vulnerabilities and lessons learned are shared with other organizations within Energy Systems and DOE. Weaknesses in the occurrence reporting and lessons learned programs are being identified. As weaknesses are identified, improvements will also be identified.

## **1. INTRODUCTION**

### **1.1 PURPOSE OF REPORT**

On May 14, 1997, an explosion occurred in the Chemical Preparation Room of PRF at Hanford's Plutonium Finishing Plant. PRF has been shut down for several years and will be deactivated in preparation for D&D. The explosion occurred in a room where non-radioactive bulk chemicals were mixed to support a now discontinued process. A spontaneous reaction of hydroxylamine-nitrate and nitric acid mixture was the cause of the explosion.

As a result of this incident, Secretary of Energy Federico Peña issued a directive to all DOE facilities on August 4, 1997, to conduct a broad initiative aimed at preventing similar occurrences at other DOE facilities. This directive contains four specific initiatives:

- DOE site contractors must scrutinize their use or storage of any chemicals that have the potential for explosion, fire, or significant toxic release, and must promptly dispose of unneeded chemicals in accordance with safety requirements and environmental regulations. DOE field offices should develop an approval process to assure the disposal or safe and environmentally compliant storage and handling of such chemicals that are retained.
- DOE field offices must reassess known vulnerabilities (chemical and radiological) at facilities that have been shut down, are in standby, are being deactivated, or have otherwise changed their conventional mode of operation in the last several years, and report status to their Program Secretarial Officers and Assistant Secretary for Environment, Safety, and Health within 120 days. Facility operators must evaluate their facilities and operations for new vulnerabilities on a continuing basis.
- DOE and contractor field organizations with operational responsibilities must assess the technical competence of their staffs to recognize the full range of hazards presented by the materials in their facilities, act on results, and implement training programs where needed.
- DOE field offices must assess their site lessons learned and occurrence reporting programs to assure that (1) outgoing information is well characterized and properly summarized, and (2) incoming information is thoroughly evaluated, properly disseminated, appropriately implemented, and tracked through formal management systems.

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## **Introduction**

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The purpose of this report is to document how PGDP LMES (also referred to as Paducah EMEF) addressed each of these four initiatives. As requested by DOE-ORO, this report also addressed the third and fourth initiatives for Environmental Management and Enrichment Facility (EMEF) operations at ETPP and PORTS.

### **1.2 SITE DESCRIPTION**

#### **1.2.1 Site Location and History**

PGDP is an operating uranium enrichment facility that includes 748 fenced acres within a DOE reservation of approximately 3,556 acres. The plant is in McCracken County in far western Kentucky, approximately 3 miles south of the Ohio River.

The closest communities to PGDP are the unincorporated towns of Grahamville (about 1 mile east) and Heath (about 1 mile southeast). The closest communities with public water supplies are Kevil, Kentucky (about 3 miles southwest), and Metropolis, Illinois (about 4 miles northeast, across the Ohio River). Paducah, Kentucky is approximately 12 miles east of the plant. The populations of the greater Paducah area, based on the 1990 U.S. census, is about 27,400. The total population of McCracken County (251 square miles) is about 62,800.

The area surrounding the plant is mostly agricultural and open land, with some forested areas. Homes are scattered along rural roads around the plant. The Tennessee Valley Authority (TVA) Shawnee Steam Plant, adjacent to the northeast border of the DOE reservation, is the only other major industrial facility in the immediate area. An Allied Signal Plant across the Ohio River near Metropolis, Illinois, produces feed material for PGDP.

The DOE tract includes approximately 1,986 acres that are licensed to the Commonwealth of Kentucky Department of Fish and Wildlife Resources as part of the West Kentucky Wildlife Management Area (WKWMA). The WKWMA is an important recreational resource for western Kentucky and is used by more than 10,000 people each year. Major recreational activities include hunting deer and small game, field trials for dogs and horses, trail riding, fishing, skeet shooting, and camping.

The plant is in the drainage areas of Big Bayou Creek and Little Bayou Creek, which flow around the western and eastern boundaries of PGDP. The two streams converge about 3 miles north of PGDP and flow into the Ohio River. Much of the water in both creeks, especially during dry weather, comes from controlled discharge at the plant. PGDP is above an 80-foot-deep gravel aquifer that provides water to private residential wells.

Before the plant was built, a munitions-production facility, the Kentucky Ordnance Works (KOW), operated in an area southwest of the plant. Munitions, including trinitrotoluene, were

manufactured and stored at the KOW between 1941 and 1946. The site was shut down immediately after World War II and later became part of the WKWMA. DOE performed preliminary investigations at the site and turned the information over to the U.S. Army Corps of Engineers (COE). COE has conducted public meetings describing their work at the site and seeking public input.

PGDP was constructed from 1951 to 1954, and production began in 1952. The plant was operated by Union Carbide until 1984, when Martin Marietta Energy Systems, Inc., was contracted to operate the plant for DOE. In July 1993, the U.S. Enrichment Corporation (USEC) became responsible for managing production. At that time, Lockheed Martin Utility Services, Inc., (LMUS), was created to serve USEC as its operations and maintenance contractor, and LMES was named as the management and operations contractor. Although USEC continues to enrich uranium for commercial nuclear power use, DOE owns the plant and property and still oversees environmental restoration and waste management activities. The plant is a significant regional employer, providing work for approximately 1,850 people from 20 counties in 4 states (Kentucky, Illinois, Missouri, and Tennessee). The annual payroll totals more than \$70 million.

### **1.2.2. Present Mission**

DOE owns the Paducah Gaseous Diffusion Plant and is responsible for Environmental Management and Enrichment Facilities programs. DOE leases the uranium enrichment production facilities to USEC.

The Environmental Management mission includes environmental cleanup and waste management. There are 208 Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) in various stages of investigation or remediation. In addition, 53,206 drums (55-gallon drum equivalents) of waste and 65,000 tons of scrap metal are stored onsite. PGDP is one of 17 major sites included in DOE Waste Management Programmatic Environmental Impact Statement.

The Enrichment Facilities mission includes management of more than 32,000 cylinders of depleted uranium hexafluoride, and maintenance of facilities and grounds not leased to USEC. In 1994, the PGDP was added to the National Priorities List (NPL).

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## **2. INTEGRATED SAFETY MANAGEMENT SYSTEM AND WORK PLANNING**

### **2.1 INTEGRATED SAFETY MANAGEMENT AT PGDP LMES**

Implementation of Integrated Safety Management System (ISMS) at PGDP LMES follows the plans for the EMEF business unit. The draft EMEF ISMS Plan was submitted to DOE on October 31, 1997. The EMEF ISMS is based on the seven guiding principles and five core functions contained in DOE Policy 450.4, *Safety Management System Policy*, DOE Policy 450.3, *Work Smart Standards* (WSSs), and Enhanced Work Planning (EWP). Successful deployment of the EMEF ISMS is full integration of these requirements into a standard, business unit-wide process for planning, endorsing, executing, and closing out all work performed. The process EMEF has adopted to lead this integration initiative is the Project Delivery System. The EMEF ISMS incorporates a tailored approach to work planned at all levels.

The EMEF ISMS also integrates many current initiatives, such as EWP and WSS. The ISMS described herein reflects a system that, when fully implemented, will ensure the protection of the workers, the public, and the environment.

The overall framework for the EMEF ISMS is organized around the following five core functions.

#### **1. Define the Scope of Work**

Defining the scope of work consists of translating the mission objectives into a definition of work that will meet those objectives, identifying expectations for the performance of work, and allocating resources to ensure that work is performed safely. Strategic direction is defined through a formal and rigorous process by DOE and contractor senior management and staff. Missions are separated into projects for each specific site remediation or facility operations. These projects are further divided into tasks or activities.

#### **2. Identify and Analyze the Hazards**

Analyzing the hazards involves identifying and analyzing the hazards and risks to the workers, the public, and the environment associated with the planned work activities.

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Hazard identification and analysis are performed by teams that may include workers, supervisors, subject matter experts, and analysts. Enhanced work planning as well as the numerous systems discussed in Section 3 are used to identify and analyze hazards.

### **3. Develop and Implement Hazard Controls**

Developing and implementing hazard controls includes identifying standards and requirements, identifying and establishing hazard controls, and implementing the controls. EMEF uses standards to set environment, safety, and health (ES&H) requirements. Standards are selected using the WSS Process, as defined in DOE Manual (DOE M) 450.3-1, *The Department of Energy Closure Process for Necessary and Sufficient Sets of Standards*. Teams of LMES personnel collected hazard data from EMEF planned work. These teams used the WSS process described in DOE P 450.3 and DOE M 450.3 to select the standards for protecting the workers, the public, and the environment. The teams include front-line workers, line management, and subject matter technical experts. The WSSs are reviewed and approved by top LMES management and DOE, and are incorporated into the contract between DOE and LMES. LMES- and EMEF-level health and safety policies, procedures, and programs are incorporating WSSs and are discussed in detail in Sections 3, 5, and 6.

### **4. Perform Work**

Performing work includes the need to adequately prepare for work, confirm readiness, perform work safely, and establish performance measures. Specific mechanisms are selected using a tailored approach. ES&H controls are implemented through the task level work control process. EMEF uses numerous mechanisms to communicate work requirements and ES&H controls to the work team. Many of these mechanisms, as related to chemical and radiological safety, are currently being implemented and are addressed in Section 3 of this report.

### **5. Provide Feedback and Continuous Improvement**

Providing feedback and continuous improvement includes collecting feedback information; identifying improvement opportunities; and making changes to improve performance, oversight, and enforcement. Feedback is captured through multiple mechanisms as described in Section 4.2.

EMEF changes processes and revises support to task supervisors to improve performance. Plans are to track and control these changes through issues management action plans.

## **2.2 WORK PLANNING PROCESS**



Paducah EMEF uses four similar processes to plan and execute work. Routine waste and cylinder handling operations are conducted using qualified operators and standard operating procedures. Detailed job and task analyses have been conducted to define the work, hazards, and related skills and knowledge. These analyses were used to develop the procedures and training requirements.

The Maintenance work control system requires definition of the work, associated hazards, and selection of hazard controls for maintenance tasks.

Construction work is managed through MK-Ferguson (MK-F). Hazards are identified, analyzed and controls selected through the MK-F Preliminary Hazard Assessment and Activity Hazard Analysis (JHA) process.

Remedial investigation and other service subcontract work is performed using JHA process that meets the requirements of 29 CFR 1910.126.

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### 3. USE, STORAGE, AND DISPOSAL OF CHEMICALS AND WASTE

This chapter responds to the first initiative addressed in the August 4, 1997, directive from Secretary Federico Peña, which reads as follows:

*DOE site contractors must scrutinize their use or storage of any chemicals that have the potential for explosion, fire, or significant toxic release, and must promptly dispose of unneeded chemicals in accordance with safety requirements and environmental regulations. DOE field offices should develop an approval process to assure the disposal or safe and environmentally compliant storage and handling of such chemicals that are retained.*

#### 3.1 HAZARDOUS MATERIALS MANAGEMENT PROGRAM

##### 3.1.1 System Overview

The PGDP LMES hazardous materials management program is founded on a basic ES&H administrative strategy of applying (1) procedures and standards, (2) information management systems, and (3) highly qualified people, to safely and effectively carry out the challenging tasks at a hazardous materials worksite. As implemented, the program embodies the basic concepts of integrated safety management contained in DOE Policy 450.4, *Safety Management System Policy*. Additional command media that apply more directly to hazardous materials management include SH-132PD, *Hazardous Chemicals in Laboratories*; SH-140PD, *Lockheed Martin Energy Systems Hazard Communication Program*; and SH-161-PD, *Hazardous Waste Operations and Emergency Response (HAZWOPER)*.

The basic command media are further implemented at PGDP LMES with procedures that include ESP-ESH-16, *Hazardous Materials Inventory Program*. An abstract of some of the key command media is included in Appendix A. Together, these procedures cover the hazardous materials and wastes at PGDP LMES; and they address the purchase, handling, storage, use and final disposition of the many additional chemicals needed for current-day operations. Incorporated into these site-level procedures is the guidance that ensures compliance with ES&H regulations.

##### 3.1.2 Hazardous Material Tracking

Hazardous Material Inventory System (HMIS) is an Oak Ridge Reservation (ORR)-wide electronic tracking and control system for hazardous chemical inventory that supports the

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ES&H regulatory and management needs of Energy Systems. The system contains more than 100,000 hazardous material items and processes more than 2000 transactions each month. It also interfaces with the company's procurement systems to record purchase activity, material location, volume/weight amounts, and basic regulatory reporting information. HMIS uses Material Safety Data Sheet (MSDS) health, safety, and hazard information to associate hazardous items with control lists and to provide internal reports of regulated and controlled materials [e.g., carcinogens, reproductive toxins, Environmental Protection Agency (EPA) Extremely Hazardous Substances, ozone depleting substances, Toxic Substance Control Act (TSCA)-listed materials, and Emergency Planning and Community Right-to-Know Act (EPCRA) 313 chemicals]. It automatically generates supporting documentation for the EPCRA 312 chemical inventory report and for other recurring reports and special requests. HMIS provides the option for users to flag excess material and to browse the Excess Material List to identify materials available for reuse. Additional HMIS features are included in the following modules:

**HMIS/Procurement Interface Module** – Allows an up-front hazard evaluation of all material requisitions prior to purchase and ensures that all hazardous materials are properly identified and that MSDSs are readily available. Pollution prevention, waste minimization, or hazard reduction by substitution of less hazardous materials may also be considered and applied prior to a hazardous material being brought on-site.

**Hazardous Materials Inventory Module** – Provides the ability to track and maintain chemical inventory information needed for regulatory compliance reporting under the EPCRA.

**HMIS Report Module** – Generates various reports interactively upon request of HMIS-trained users of the system. This module provides chemical custodians with an inventory tracking capability, as well a source of information about chemical purchases and use. The EPCRA Compliance Manager uses this module to monitor sitewide inventory totals for each chemical that could be reportable.

**System Manager Module** – Allows system managers to monitor system activity, maintain error reports, lists, tables, and codes, manage access to the system, and perform quality assurance.

At PGDP LMES, the implementation of HMIS is an on-going process with HMIS replacing manual methods of chemical inventory and tracking. Plans are to continue the phase-in of HMIS and reliance upon the system for use in regulatory report preparation and for overall support to the chemical management program.

### **3.1.3 Hazard Communication**

*The Energy Systems Hazard Communication Program Description*, SH-140PD, outlines the methods for communicating the potential hazards of chemicals used in the workplace to workers. These methods include employee training, container labeling, and use of MSDSs.

Awareness level hazard communication training is provided for Energy Systems employees, service subcontractors, and visitors during General Employee Training (GET). A more complete discussion of training is provided in Section 5. Labeling is used to identify hazardous chemicals and associated hazards.

MSDSs for hazardous chemicals used in work areas are accessible to employees, service subcontractors, and visitors. The MSDS provides detailed hazard information such as material compatibility data for chemicals purchased from the manufacturer and chemicals produced as byproducts or manufactured in the workplace. The responsible supervisor of each work area maintains a list of the hazardous chemicals used in the work area. This list and corresponding MSDSs is readily available to workers for review.

### **3.1.4 Process Safety Management**

The hazard and accident analyses performed in the formulation of the 1995 PGDP Safety Analysis Report (SAR) determined that no facilities fall under the requirements of 29 CFR 1910.119, *Process Safety Management* (PSM). Potential increases in facility inventories that could result in exceeding Threshold Quantities (TQs) are controlled by application of PDFS-1001, *Unreviewed Safety Question Determination Program (USQD)*, as well as for purchased chemicals by application of HMIS, which automatically flags PSM (and other) TQs.

### **3.1.5 EPA Risk Management Program**

The 40 CFR 68 Risk Management Program (RMP) rule is not applicable until June 1999. As with the PSM rule addressed above, potential increases in chemical inventories such that EPA RMP thresholds would be exceeded are required to be evaluated in accordance with FS-102, *USQDs*, and the HMIS database flags RMP TQs.

### **3.1.6 Laboratory Practices**

In addition to corporate and PGDP site-specific procedures relating to hazardous materials and waste management mentioned, PGDP LMES maintains laboratory-specific chemical hygiene plans (CHPs). The CHPs meet requirements of the Occupational Safety and Health Act (OSHA) Standard 29 CFR 1910.1450 and were developed according to guidelines and models for other plans. The CHPs identify procedures and work practices that are necessary

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for the protection of personnel. The CHPs also provide procedures and guidance to minimize opportunity for chemical incompatibility accidents or incidents involving materials that contain special hazards such as explosives, pyrophorics, and peroxidizables.

Laboratories maintain a detailed inventory of chemicals using HMIS as described in Section 3.1.2. Safe storage of chemicals is also maintained by following recommended guidance from manufacturers, including recommendations relative to shelf life and expiration date.

### 3.2 WASTE STORAGE AND DISPOSAL PROGRAM

#### 3.2.1 System Overview

The handling, safe, and environmentally compliant storage and disposal of hazardous chemicals and waste is conducted in accordance with DOE orders and numerous procedures maintained by LMES, PGDP LMES, and Site Operations. A summary of the most relevant corporate PGDP site-specific procedures relative to waste storage and disposal is found in Appendix A. The procedures are based on applicable and relevant requirements found in 40 CFR, Protection of the Environment; Chapters 30-37 of the Kentucky Administrative Record, Title 401; and 49 CFR, *Transportation*. In addition to conducting operations in accordance with federal, state, and local requirements, PGDP LMES has implemented best management practices exceed regulatory requirements.

The process of environmentally compliant storage and disposal of hazardous chemicals and waste begins at the point of generation. This includes chemical compatibility assurance. The generator maintains responsibility for proper waste management until disposed. When a request for disposal is made, Site Operations personnel coordinate with generators to confirm the identity of the materials they will be receiving and prepare to receive the waste into inventory in a manner that meets all compliance-related requirements. Once a waste is found to meet the waste acceptance criteria (WAC) for the receiving facility and is received into inventory, it is actively managed through frequent inspections until final treatment and disposal. Immediate corrective actions are taken for all off-normal conditions. Disposal of the waste material occurs only after the chemical composition is confirmed via analytical testing and an appropriate disposal outlet is available. The readiness of offsite disposal facilities is rigorously monitored.

#### 3.2.2 Waste Management Risk-based Strategy for Waste Disposition

The waste management risk-based strategy for waste disposition establishes a specific risk-based evaluation methodology to prioritize treatment and disposal of legacy and newly-generated individual waste streams that are the responsibility of the organization. The risk-

based plan has been drafted and is in the review process. Once the document is finalized, a team of PGDP personnel will be chartered to implement the risk-based evaluation methodology for prioritizing the treatment and disposal of PGDP LMES' waste streams.

### **3.2.3 Waste Tracking System**

Once waste is received or picked up from the on-site generator and the Site Operations personnel have ensured the waste is acceptable per the WAC, Site Operations then determines the appropriate disposition of the waste items. Emphasis is placed on the shipment of waste to the appropriate treatment, storage, or disposal facility. In the interim, waste may be stored in a permitted storage facility at PGDP LMES. Site Operations personnel use the Field Work Request System to authorize activities relating to the management of waste, such as picking up/receiving waste containers, moving containers, sampling containers, re-containerizing, loading containers for shipment to an offsite treatment disposal unit, and so forth. Prior to scheduling a waste item to be moved, Site Operations personnel ensure that all onsite transfers are conducted in accordance with the requirements specified in Resource Conservation and Recovery Act (RCRA) permits and facility-specific authorization basis documents.

Site Operations personnel are also responsible for the operation and maintenance of the Waste Management Information System (WMIS) used at PGDP LMES. Data regarding a waste item (request for disposal number, container bar code, container description, storage location, etc.), is entered into WMIS by a controlled set of personnel. This information system allows for the generation of regulatory-required reports and other performance indicator reports as specified by the users. WMIS is the official data system for waste information at PGDP LMES. Implementation of a new waste tracking system, Waste Information and Tracking System (WITS), is scheduled for this fiscal year (FY).

### **3.2.4 Waste Management Facility Practices**

PGDP LMES's major waste management facilities include many waste storage units. These facilities rely on LMES, PGDP LMES, and facility-specific policies, procedures, and programs for the prevention of fires, explosions, and release of hazardous materials. The Facility Safety Program provides the mechanism for ensuring that the health and safety of employees and the public are protected from nuclear, chemical, biological, or unusual high-energy hazards. Requirements for compliance with environmental, industrial, firearms, and occupational safety are not within the scope of this program. The Facility Safety Program encompasses three major activities: the program maintains the DOE-approved authorization basis for all nuclear and non-nuclear facilities, implements a USQD process for change evaluation, and manages the Nuclear Criticality Safety (NCS) program. Hazards identified within these three activities are prevented or mitigated by DOE-approved control measures. Additional requirements have been established to protect the worker and the environment which are identified in RCRA

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permits, national fire protection codes, CFRs, and OSHA requirements to name a few. The Facility Safety Program also includes these requirements in facility-specific authorization basis documents. Appendix B provides additional information on Site Operations facility practices.

### 3.2.4.1 Waste Storage Tanks - Verification

Site Operations' polyethylene waste storage tanks, which contain waste water, are monitored via visual inspections daily, while others are routinely inspected monthly. Discrepancies (e.g., tank level changes) are noted on inspection logs and communicated to the waste coordinator and facility operator for corrective action. Additional guidance is given in PGDP LMES procedure, PTWM-2002, *Wastewater Accumulation, Storage, Treatment, and Disposal* summarized in Appendix A.

### 3.2.4.2 Waste Acceptance and Material Compatibility

Waste information is reviewed by a Site Operations coordinator prior to acceptance for storage. Incompatible materials are stored in separate locations to reduce the chance of adverse reactions. Documentation which defines the waste acceptance criteria has been drafted and is currently in the review stage. The drafted criteria is presently utilized to determine the acceptance of waste for storage. Official implementation of the criteria is projected for January 1998.

### 3.2.4.3 Overpressurization Protection

Pressure relief devices may be used on containers determined to contain waste streams that have the potential to cause over-pressurization problems. Identification and retrofitting of suspect containers with pressure relief devices, when possible, is an ongoing effort within the Site Operations Organization.

As part of Site Operations activities, some drums and containers are inspected daily while others are inspected weekly, bi-weekly, and monthly. If an over-pressurized drum or container is suspected or identified, all activities are stopped. The general supervisor is contacted, who in turn contacts the Plant Shift Superintendent (PSS). Depending on the situation, the PSS may elect to have Fire Services puncture and vent the drum. After the appropriate corrective action has been identified, a work instruction is generated and used to ensure that the appropriate personal protection equipment is identified and the appropriate steps are followed to relieve the over-pressurized drum or container.



### **3.2.5 Excess/Surplus Materials and Wastes**

Inventory stock of chemicals is managed to ensure minimum stock levels. The majority of chemicals utilized at PGDP LMES are procured as needed and are not stocked in stores inventory. Site personnel are encouraged to list excess chemicals in any quantity on the Swap Shop, a Web-based electronic reutilization system that is accessible to all Oak Ridge DOE contractors. This system provides a listing of materials and chemicals that are excess to the needs of particular organizations. This minimizes procurements of hazardous materials, reduces excess materials in storage, and reduces chemicals that might otherwise be declared a waste.

At PGDP LMES, a purchase requisition review is conducted by the health and safety organization on all items purchased to ensure that materials and equipment being purchased for use meet OSHA, American National Standards Institute (ANSI), and other applicable safety standard requirements prior to purchase. A hazardous material review is also conducted, which allows an up-front hazard evaluation of all material requisitions prior to purchase and ensures that all hazardous materials are properly identified, that MSDSs are readily available, and that provisions for proper storage have been considered. As discussed in Section 3.1.2, hazard reduction by substitution of less hazardous materials may also be considered and applied prior to a hazardous material being brought on-site.

### **3.2.6 Pollution Prevention**

The pollution prevention program at PGDP LMES is described in *KY/EM-208, 1997 Paducah Pollution Prevention Programs Plan, May 1997*. The Pollution Prevention Program promotes and implements practices that reduce or eliminate the amount and toxicity of waste and pollutants in the air, water, and on land. Crucial activities of the Pollution Prevention Program involve improving operating practices by substituting less toxic or hazardous materials in process operations and changing processes to produce less toxic products/wastes whenever possible. The Pollution Prevention Program also promote the use/substitution of nonhazardous materials for hazardous materials in operations to minimize potential risk to human health and the environment.

The PGDP LMES Pollution Prevention Program was developed based upon requirements contained in the following documents:

*Guidance for the Preparation of the Waste Minimization and Pollution Prevention Awareness Plan*, DOE Defense Programs, December 1993

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*DOE Order 5400.1 Site Waste Minimization and Pollution Prevention Awareness Plans DOE-wide Implementation Guidance-Update*, DOE Environmental Management, March 1994

*Pollution Prevention and Waste Minimization Guidance for Environmental Restoration Activities*, DOE Regulatory Integration Division (EM-431), Office of Environmental Restoration, May 1994

*DOE Waste Minimization/Pollution Prevention Crosscut Plan*, 1994; and *Guidance for Preparation of Site Pollution Prevention Plans*, DOE Environmental Management, February 1997.

All LMES personnel have access to the LMES electronic Swap Shop, which is administrated by the ETTP Property and Materials Management Division. The Swap Shop allows chemicals that are declared excess by one division or site to be available to another division or site. The Pollution Prevention Program supports the Swap Shop effort.

### **3.2.7 Accomplishments**

In FY 1997, PGDP worked 2.6 million man hours without a single lost day work case due to injury or illness. Nearly 150,000 of those man hours were worked on PGDP LMES waste projects.

#### **3.2.7.1 Treatment**

- Completed 42 sampling events representing 1220 containers
- Seven drums of chromate waste were shipped to Oak Ridge National Laboratory (ORNL) for treatability studies
- Crushed 100% of 32,000 fluorescent light bulbs
- Processed 11,295 gallons of waste water through an activated carbon absorber
- Continued site preparation for the Vortec Vittrification facility and initiated an environmental assessment

#### **3.2.7.2 Storage**

- Achieved 13.2% reduction in waste storage areas through consolidation and disposal
- Upgraded the C-746-Q Fissile Material Storage Facility
- Decontaminated 40% of C-746-Q and completed a lighting and ventilation upgrade
- Initiated operation of the C-752-A Storage Facility

- Completed routine characterization of 425 containers
- Passed state RCRA Inspection without any notices of violation for the fourth consecutive year

### **3.2.7.3 Disposal**

- Removed 77 drums of Aerosol Cans from ignitable waste storage
- Shipped nearly 300,000 pounds of material to the Toxic Substance Control Act Incinerator (TSCAI) in Oak Ridge
- Disposed of 3,033 tons of DOE and USEC waste streams in the landfill
- Relocated 5,000 containers of Soil and Plastic Debris to a landfill staging area and received State approval to dispose of 4,800 of those

### **3.2.8 Plans - FY 1998**

- Maintain 100% compliance and remain injury free
- Dispose of 8000 DOE legacy waste containers in the landfill
- Treat approximately 16,000 gallons of waste water on-site
- Complete two shipments to the TSCAI in Oak Ridge
- Ship 4 containers of cyanide waste for treatability study
- Complete 34 sampling events representing over 7,000 containers
- Complete the fluorescent light bulb disposal project (32,000 bulbs)
- Finalize the Environmental Assessment for Vortec Vitrification Facility
- Package and stage for shipment 809 low level waste ash receivers and 650 containers of uranium precipitate
- Dispose of 1,000 cubic yards of cylinder yard construction debris in the landfill

### **3.2.9 Performance Indicators**

Appendix C includes sample performance indicators used at PGDP LMES regarding the reduction of waste, excess chemicals, and other potential vulnerabilities.

## **3.3 FACILITY SAFETY PROGRAM**

The mission of the PGDP LMES Site Facility Safety Program is to provide a consolidated method for the identification and evaluation of hazards, control and minimization of analyzed hazards, and the communication of results to PGDP LMES site personnel. The product of the PGDP LMES Site Facility Safety Program is documented Safety Authorization Basis (SAB) for the operation of facilities and activities on site that have been shown by evaluation and analysis to present only an acceptable risk to onsite or offsite personnel or the environment.

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The primary function of Facility Safety is risk reduction. This is achieved by ensuring that activities have been appropriately evaluated for hazard potential. Activities with unacceptable risks are prohibited. For activities with inherent hazards, measures must be devised to ensure that the hazards are controlled and do not pose an unacceptable risk to personnel or the environment.

### 3.3.1 Program Components/Elements

The program integrates several diverse technical, administrative, and operational disciplines. These disciplines function to identify, analyze, and verify the control of hazards associated with operations and activities that potentially impact the health and safety of personnel at or near the PGDP LMES site.

Documents that are created for facilities, activities, and processes after completion of analyses and development of mitigators and controls are called SAB documents. These documents describe important concepts needed for the safe operation of facilities. Development and issuance of these documents establish the operational boundaries or “envelope” that must be maintained by the facility operator and personnel to have continued safe operations and compliance with regulatory requirements.

### 3.3.2 Facilities

The Facility Safety Program described within this document applies to all facilities under the operational control of PGDP LMES Site management. These facilities include those within the recognized site boundaries and those offsite facilities, operated or occupied by PGDP LMES personnel. A “facility” can be a fixed building or structure, a mobile structure such as a trailer, or a geographical location such as a landfill, storage tank, or environmental monitoring station. A “facility” may also be a designated area inside or associated with a structure. Baseline preliminary hazard screenings are required for all facilities. Additional analyses are required for significant hazards identified in the baseline screening process. The screening criteria for hazardous chemicals is based on DOE Environmental (EM) Standard 5502-94 and 40 CFR 302.4, *Reportable Quantities*.

### 3.3.3. Activities

The PGDP LMES Site Facility Safety Program applies to all activities, operations, or processes that can adversely affect the health and safety of onsite or offsite personnel, as well as the environment. These activities are typically associated with the use of toxic, reactive, or radiological materials or materials with unfavorable physical properties (flammable, explosive,

asphyxiants). Additional activities, operations, and processes that could fall under the PGDP LMES Site Facility Safety Program are those with unusual or hazardous energy sources or equipment not typically controlled by general industry standards requirements.

### **3.3.4 Requirements**

Facility Safety guidance and direction is obtained from numerous sources. Governmental regulations, Lockheed Martin Corporate, Energy Systems and PGDP LMES site-specific policies, program documents, and procedures establish the requirements and guidelines for the site's Facility Safety Program. These documents are readily available to site personnel through electronic databases and paper texts. The primary Energy Systems documents that present the scope, purpose, and operation of Facility Safety Programs are FS-101PD, *Facility Safety Program*; FS-102, *Unreviewed Safety Question Determinations* (USQDs) ; and FS-103PD, *Safety Documentation*. A description of each of these command media is included in Appendix A. Site specific procedures provide additional detail for the implementation of ES requirements (EMEF PMFS-1000-1005).

## **3.4 ENVIRONMENTAL COMPLIANCE**

### **3.4.1 National Environmental Policy Act Reviews**

The National Environmental Policy Act (NEPA) provides a means to evaluate the potential environmental impact of proposed federal activities and to examine alternatives to those actions to ensure informed decision-making. LMES procedure ESP-EP-163, *National Environmental Policy Act Review and Compliance*, establishes administrative controls and provides requirements for project reviews and compliance with NEPA. Each proposed action and all components of the action are reviewed for its potential to result in significant impacts to the environment. Based on technical information supplied by the responsible organization, an appropriate level of NEPA documentation is prepared. NEPA reviews are conducted early in the planning cycle to provide input into the decision-making process, thus allowing time for changes prior to construction or prior to proceeding with process implementation. The Energy Systems Environmental Compliance Organization utilizes the *Energy Systems NEPA Project Review Checklist*, completed by the manager of the proposed project, to assess potential project impacts and make a recommendation to DOE regarding the appropriate level of NEPA documentation. NEPA documentation is then prepared, reviewed, and approved by appropriate personnel prior to initiating detailed design or commencing field work.

### **3.4.2 Remedial Action (RA) Program**

RCRA requirements for PGDP hazardous waste storage and treatment operations and the corrective actions program are contained in two separate but related permits. These include a

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Hazardous Waste Management Permit, issued and administered by the Commonwealth of Kentucky, and the Health and Safety Work Authorization (HSWA), issued and administered by the USEPA. These permits were issued on July 16, 1991, and constitute the RCRA Permit for PGDP. The permits contain a schedule of compliance for investigation and corrective action for SWMUs. Additionally, the Paducah Plant was placed on the NPL under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) in May of 1994. As a result, a Federal Facility Agreement (FFA) has been negotiated between DOE, EPA, and the Commonwealth of Kentucky to provide a framework for coordinating the environmental cleanup programs of both RCRA and CERCLA; however, the FFA is not expected to be signed until early FY 1998.

To date, 208 SWMUs/AOCs have been identified at the Paducah Plant. These SWMUs and AOCs have been grouped into 30 waste area groups (WAGs) and prioritized for the purpose of undergoing the remedial process (e.g., PA/SI, RI/FS, RD/RA). Additionally, the site contains two large groundwater plumes extending offsite which are often referred to as the Northeast and Northwest Plumes. The Northwest Plume contains Trichloroethylene (TCE) and Technetium (Tc-99) and extends about three miles north toward the Ohio River. The Northeast Plume contains primarily TCE, and extends a similar distance from the northeast portion of the plant. Interim actions for these plumes have been implemented to initiate control of the high-concentration areas. Final actions for these areas will be addressed under WAG 26.

### 3.4.2.1 Technical Approach

The technical approach for the RA Program includes strategies for establishing site priorities, remedial goals based on land use, source control actions, and RAs for groundwater and surface water contamination. The 208 SWMUs/AOCs have been divided into 30 WAGs (potential operable units [OUs]) based on common characteristics including contaminant types, geographic locations, media, remedial alternatives and other common factors. The WAGs were then prioritized for the purpose of undergoing the RA process to focus resources and ensure prompt actions are taken to address threats to human health and the environment. The WAGs were prioritized based on the following criteria:

- 1) Mitigate immediate threats in all media, either on- or offsite
- 2) Control “hot spots” associated with offsite contamination
- 3) Address suspected sources of offsite contamination
- 4) Address suspected sources of onsite contamination
- 5) Final actions for groundwater and surface water integrator units

The RA process for the various WAGs will typically include work plan development for sampling activities, remedial investigations, risk assessments, treatability studies, feasibility studies, remedy selection, remedial design, remedial construction, operation/surveillance, and maintenance, as appropriate.

The current and anticipated future use of the property that comprises PGDP will have a significant impact on the cleanup standards, types of RAs selected, and total costs for site remediation (e.g., industrial use vs. residential). Based on existing lease agreements, congressional plans to privatize USEC, the complex nature of site contamination, and stakeholder input gathered to date, the current land use of mixed industrial/recreational is expected to be the most likely future use at the site. Therefore, the following remedial goals and points of exposure have been established to provide the framework for developing cleanup standards at the site:

- 1) Protect industrial workers from direct contact of surface and subsurface soils (0'-10') for work conducted inside the security fence
- 2) Protect groundwater users at the DOE property boundary
- 3) Protect recreational users outside security fence
- 4) Protect sensitive ecosystems outside security fence

To accomplish these goals, the remedial strategy includes a combination of source-control actions at the individual SWMUs, followed by RAs for groundwater and surface water contamination also referred to as integrator units. Because integrator units typically encompass large geographic areas that collect releases from multiple source units, final actions for integrator units are deferred until releases from the contributing source units are mitigated. However, because integrator units also serve as migration pathways to potential receptors, interim actions early in the process may be necessary to ensure adequate protection to human health and the environment while source units are being addressed. Several interim actions addressing imminent risks and hot spots have already been implemented, and the need for additional interim actions will continually be considered during the remaining source unit investigations, as appropriate. Groundwater and surface water data collected during the individual source unit investigations will ultimately be combined to complete the remedial investigation (RI) data needs for the surface water and groundwater OUs.

### **3.5 Surveillance and Maintenance (S&M) Program**

The S&M involves the day-to-day surveillance, maintenance, and operation of all DOE facilities and sites. There are six major scope elements of this operation. These include:

- operation of the northwest and northeast groundwater plume pump and treatment facilities as per regulatory agreements and operation and maintenance plans,

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- surveillance of all Paducah DOE facilities (30 separate structures), and RA sites (208 SWMUs) to monitor conditions and ensure compliance with program requirements,
- maintenance of all facilities and sites (including those listed above, groundwater monitoring wells, and D&D and inactive facilities) to prevent degradation and correct deficiencies,
- S&M operations at post-remediation sites to comply with regulations and regulatory agreements,
- facility stabilization actions that improve conditions and/or lower costs or risks, and facility and program management to ensure efficient, safe operation.

### 3.6 WASTE STORAGE TANK AND ANCILLARY EQUIPMENT ASSESSMENT

PGDP LMES has identified all storage tanks including active tanks still in use, and inactive tanks no longer in service. During 1995, PGDP LMES conducted a comprehensive inspection program to assess all storage tanks. One radiological vulnerability, discussed below, was identified and a tank inventory developed.

The scope of this effort includes storage tanks, which are defined as enclosed vessels with in/out process lines and having greater than 100 gallon capacity. Excluded are sumps, pits, trenches, water holes, cylinders, converters, compressed gas and liquid nitrogen containers, atmospheric containers with open tops and basins.

Although most of the storage tanks at PGDP LMES are identified via inventories, plans are to develop a site-wide tank inventory. Existing storage tanks are organized in three major groups: Site Operations, Remediation Projects, and Facilities and Surveillance and Maintenance. Each will be discussed separately.

#### **Site Operations:**

Site Operations operates waste storage facilities with inventories of 1000 and 1200 gallon mobile tanks and 2500 gallon stationary tanks which are maintained on a database. The tanks are either empty or contain some amount of potentially contaminated water, but pose no acute threat. Characterization of these is ongoing. To date, no vulnerabilities have been identified.

Site Operations also manages fixed tanks which have been characterized, emptied, and pose no acute threats, with the exception of one 8,000-gallon tank containing Tc-99 waste. The Tc-99 tank, located in C-746-Q, has not been characterized; therefore, it is identified as a radiological vulnerability and is scheduled to be sampled in Spring 1998.



Verification of tank statuses is complete.

**Remedial Projects:**

Remedial Projects manages many activities relating to underground storage tanks and above ground storage tanks. All of the underground storage tanks are characterized, maintained on a database, and are either removed, empty, or filled with an inert material. The above ground storage tank summary is also maintained on a database. Tank statuses have been determined and no new vulnerabilities identified.

**Facilities and Surveillance and Maintenance:**

PGDP LMES has a facility which treats groundwater and contains active and inactive tanks; all of which are characterized and pose no acute threat. The tanks are vented and are not closed or pressurized systems.

The D&D facilities are filled with process equipment that includes tanks. During an effort that ended in December 1994, the equipment was inventoried and inspected. All tanks were emptied or drained. The work was documented in the following reports:

Building C-342 Status Investigation Reports, December 1994, CDM Federal Programs Corporation, 7914-245-FR-BCFL

Building C-340 Status Investigation Reports, December 1994, CDM Federal Programs Corporation, 7914-245-FR-BCFQ

C-410 Feed Plant Complex Status Investigation Reports, CDM Federal Programs Corporation, 7914-245-FR-BCGS

Verification of tank statuses is complete.

**3.7 RUPTURED WASTE DRUM INSIDE C-746-Q RCRA WASTE STORAGE FACILITY**

On September 15, 1997, a waste drum containing nitric acid was found ruptured in the C-746-Q RCRA Waste Storage Facility at Paducah. A level II occurrence report was initiated by LMES with a subsequent Type B investigation initiated by DOE. The Type B Investigation Report is currently being printed.

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The investigation found that material compatibility was the root cause of the incident. The waste was stored in a three-part container system consisting of an inner 55-gallon polyethylene/steel-lined drum contained in an 85-gallon steel overpack (without a polyethylene liner) which was then overpacked in a 110-gallon polyethylene-lined steel overpack. The nitric acid solution was generated in the 1960's in a neptunium recovery process. The innermost polyethylene container was probably the original container of the material. Polyethylene becomes brittle with long-term exposure to nitric acid. Although this information has been widely disseminated throughout DOE, the vulnerability associated with storage of these containers at Paducah was not recognized. The embrittled container then failed (i.e., cracked) during routine handling, either sampling or drum movement. Once the inner container failed, the nitric acid came in contact with the inner steel overpack which did not have a polyethylene liner. Nitric acid is highly reactive with metals. A reaction ensued between the nitric acid and the steel overpack which generated nitrogen dioxide gas. The gas generation was rapid. The container system soon became overpressured and ruptured spewing approximately half the contents. No one was in the facility when this event occurred.

Upon discovery of the spill, the Hazardous Material (HAZMAT) Response team was called and immediate HAZMAT response was initiated. Once it was determined that the situation was stabilized, the response was turned over to a recovery team. Protection of personnel was the utmost objective of the recovery team. The team worked with the DOE Type B Investigation Team to ensure that the recovery actions were supportive of the findings of the investigation team. Additional nitric acid waste is stored at Paducah in a similar fashion as the incident container. The recovery team expanded the recovery operation to also address the vulnerability posed by the similar waste material. Several actions/options were evaluated to reduce the vulnerability. The option of choice was to treat the like waste on-site and ship off-site for disposal. Recognizing that there would be some time before the treatment option could be executed, several mitigating actions were taken. These included the following:

- issuing a restriction on the movement and sampling of all acid-containing waste since movement/handling was determined to be an initiator
- restricting access to the area where similar waste are stored and establishing a 25-foot buffer area
- placing wire fencing over and a curtain around the subject waste to control and mitigate hazards in the event of another drum rupture.

On November 24, 1997, a contract was placed to treat the subject waste. The treatment team is on-site as of the date of this report. Treatment is scheduled to be completed by December 19, 1997.

In addition, it was recognized that chemical compatibility problems had the potential to exist with other waste packaging systems. An independent third party was brought in to evaluate all

the waste streams at Paducah for this potential. The report is being prepared and will be available by January 1, 1998. Corrective actions will be developed to address the findings of this report when it becomes available.

Another programmatic deficiency was recognized and is being addressed. This deficiency is associated with a "RCRA-compliant" culture. The waste in question was being stored in accordance with RCRA; however, the true hazards of the waste were not fully recognized, appreciated, or addressed. A true integrated, risk-based waste management program is needed at Paducah. This program should encompass all waste streams and all risks. Money should be spent on treatment/disposition of the highest risk waste first. This may require renegotiation of the various regulatory Federal Facility Compliance Agreements (FFCAs) to accomplish. A methodology to rank waste by risk has been drafted and is in review as discussed in Section 3.2.2. Once the methodology is accepted, the waste streams at Paducah will be ranked and funding will be allocated according. Baseline change control to the Paducah Waste Management program will be utilized to establish the revised baseline. Since FY-1998 funding levels and projects are already established, it is the goal of the Paducah program to implement this risk-based program beginning with the FY-1999 funding cycle.

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## **4. KNOWN VULNERABILITIES**

This chapter responds to the second initiative addressed in the August 4, 1997, directive from Secretary Federico Peña, which reads as follows:

*DOE field offices must reassess known vulnerabilities (chemical and radiological) at facilities that have been shutdown, are in standby, are being deactivated, or have otherwise changed their conventional mode of operation in the last several years, and report status to their Program Secretarial Officers and Assistant Secretary for Environment, Safety, and Health within 120 days. Facility operators must evaluate their facilities and operations for new vulnerabilities on a continuing basis.*

### **4.1 STATUS OF KNOWN VULNERABILITIES**

A report that addresses the status of known vulnerabilities is included in Appendix D. A copy of this report was provided to the PGDP DOE Site Office on November 17, 1997.

### **4.2 PROCESS FOR EVALUATING NEW VULNERABILITIES**

The systems used at PGDP LMES to identify and evaluate new vulnerabilities on an ongoing basis are consistent with the functions of ISMS. The overall site program for ISMS is described in Section 2. An important part of the site's ISMS Program involves adequate work planning, which is particularly applicable to the ISMS functions of defining work scope, analyzing hazards, identifying work controls, and performing work in accordance with the controls. Vulnerabilities are identified during the working planning phases of projects and activities. In addition, the detailed programs, practices, and systems discussed in Sects. 3.1 through 3.6 also identify vulnerabilities. Applicable ISMS functions for these programs and practices include analyzing the hazards, identifying work controls, and performing work in accordance with the controls. The remaining ISMS function, feedback and continuous improvement, is achieved through a variety of site programs and systems discussed in this section.

#### **4.2.1 PGDP LMES Site-wide Systems**

##### **4.2.1.1 Radiological Control Surveys and Assessments**

Radioactive contamination surveys are performed in certain areas on a routine basis, and in other areas as requested to support projects and work activities. Surveys are also performed if radioactive contamination is suspected to be present in areas where contamination was not previously known to be present. Radiological control surveys are limited to radioactive

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## **Known Vulnerabilities**

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contamination and materials, and to a lesser extent for PGDP LMES, radiation. Self-assessments are performed on a daily, weekly, and quarterly basis as prescribed by Work Instruction WI-PRP-203, *Internal Assessment Program*. Results are documented on Radiological Awareness reports and Radiological Deficiency reports.

LMES performs annual integrated audits, which consist of subteams addressing management and quality, safety and health, and environmental protection issues. The audit subteams are made up of subject matter experts from other LMES sites and central staff who perform in-depth reviews of processes and field conditions with an emphasis on safety, health, and environmental protection. Audit findings, including those that identify vulnerabilities, are addressed in the issues management system and tracked until corrected.

### **4.2.1.2 Corporate Environment, Safety, Health, and Quality Assurance Audits**

A Lockheed Martin Corporation Environment, Safety, Health, and Quality Assurance audit is performed by a team of subject matter experts from other sites across the country every 3 years. It is anticipated that the Management & Integration (M&I) contractor will perform similar audits. The emphasis of these audits is on safety, health, and environmental protection in the work place and compliance with related regulations and orders. Audit findings, including those that identify vulnerabilities, are addressed in corrective action plans approved by senior Lockheed Martin management. The findings are also placed in the issues management system and tracked until corrected.

### **4.2.1.3 Annual Environmental Self-Assessments**

A self-assessment of PGDP LMES is performed by the Environmental Compliance Organization annually. Included in the self-assessment are activities conducted throughout the year, such as

- RCRA satellite and 90-day accumulation area assessments,
- Polychlorinated Biphenyl (PCB) storage areas assessment,
- Clean Air Act assessments, and
- Clean Water Act assessments.

### **4.2.1.4 Internal Independent Audits**

A series of audits of site activities, including those related to vulnerability identification and correction are performed each year, independent of the management self-assessments. The audits are performed by trained auditors, using checklists based on regulations and requirements. As with other audits, the findings are placed in the issues management system and tracked until corrected.

#### **4.2.1.5 Facility Excellence Walkdowns**

The Facility Excellence Program involves weekly walkdowns of selected facilities to assess ES&H concerns as well as general facility conditions. Walkdown teams include senior and line management, facility operators, workers, and ES&H professionals. The facilities are rated on a scale by the walkdown teams. The program promotes continued awareness of facility conditions by building operators and occupants. Any concerns regarding hazardous/radioactive materials and wastes are identified by the walkdown teams as part of the overall ES&H assessments.

#### **4.2.1.6 Fire Protection Evaluations and Audits**

PGDP LMES Fire Protection Engineering prepares engineering surveys of most major buildings on the site. These surveys involve walkdowns of the building by a qualified fire protection engineer, analysis of the building for compliance with relevant fire codes and standards, and preparation of a report that includes building description, building occupancy, life safety considerations, a fire risk analysis, and findings and recommendations.

Under a memorandum of understanding, the PGDP LMUS Fire Protection Program management staff performs monthly walkdowns of each in-use building belonging to PGDP LMES. The walkdowns identify dangerous accumulations of combustibles, blocked exits, impaired or missing fire-related equipment.

Annually, the PGDP LMES Fire Protection Program management staff conducts walkdowns of each in-use building at PGDP LMES. The walkdown assessment is part of the fire prevention inspection, accomplished as part of the methodology for annual building fire safety assessments and includes program-related issues, facility-related issues, and combined aspects of fire prevention. These assessments identify areas such as comprehensiveness of the fire protection program, life safety considerations, fire suppression equipment, and training.

Chapter 11 of the PGDP SAR provides additional detail of the fire protection evaluations and audits.

#### **4.2.1.7 Line/Facility Self-Assessment**

Line management has the primary responsibility for implementing an effective, ongoing self-assessment program that ensures participation by their employees as well as all levels of management within their organization. The self-assessment process is the upper-tier process for which all other processes for identifying vulnerabilities are integral parts. The chemical and radiological hazards associated with the operation or facility are well known to the

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## **Known Vulnerabilities**

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line/facility manager and form the basis for the operating procedures and SAB documents. Line and facility management are the logical point for the planning and implementation of effective self-assessment programs, because they possess the operation and facility expertise.

### **4.2.1.8 Nuclear Material Control & Accountability (NMC&A) Audits**

Comprehensive internal audits of each NMC&A program element are conducted to assure the effectiveness of the implementation of the NMC&A program. Audit frequency is established by DOE requirements, based on the category of nuclear material within the Material Balance Area.

### **4.2.1.9 Emergency Planning Exercises**

PGDP LMES participates in the biennial PGDP Full-Participation Exercise and performs self-assessments during site-wide drills. Each drill and exercise, noted in PGDP LMUS procedure CP2-EP-EP-5052, *Emergency Response Drills and Exercises*, is subject to an activity critique for vulnerabilities and areas for improvement. The results of exercises and drills are documented in exercise reports.

### **4.2.1.10 Price-Anderson Amendments Act (PAAA) Noncompliance Reporting Process**

PGDP LMES's philosophy of self-reporting is a well-established tradition in the site culture. This cultural principle has been effectively integrated into the PAAA Noncompliance Reporting Process. The process is directed toward Category 2 and 3 site activities (PGDP LMES has no Category 1 facilities) and radiological facilities. The PGDP LMES PAAA Process is described in NS-120, *PAAA Noncompliance Determination Process*.

### **4.2.1.11 Health and Safety Review Committee (H&SRC)**

The H&SRC consists of experienced, senior individuals (independent of line operations) with diverse technical backgrounds providing an independent, multidisciplinary review and approval of safety analysis documentation in accordance with LMES Program Description FS-103PD and DOE requirements.

The H&SRC reviews and approves all new or revised safety analysis documentation prepared in fulfillment of DOE Orders and Standards, all new or revised safety analysis documentation prepared in accordance with 29 CFR 1910.119 or 40 CFR 68, and all Safety Evaluations of changes or experimental activities performed in accordance with DOE Order 5480.21.



#### **4.2.1.12 Critiques of Events**

Reported unusual events are evaluated using a structured critique process led by a trained facilitator. The process is designed to gather facts concerning the event and determine the cause or causes including the identification of any vulnerabilities that may be present and may have contributed to the event.

#### **4.2.1.13 S&M Routine Surveillances**

Facilities that are declared in the S&M Program pending decontamination, demolition, and environmental restoration are given periodic surveillance inspections to determine facility conditions. These inspections identify vulnerabilities related to deteriorating conditions.

#### **4.2.1.14 DOE Voluntary Protection Program (VPP)**

The DOE VPP requires a thorough review and reporting of DOE and operating contractor site management accountability and program evaluations on their commitment to the principles of compliance with occupational safety and health policies, goals, and objectives. Participation requires effective employee involvement, worksite analysis, hazard prevention and control, safety and health training for both supervisors and employees, and assurances of commitment by both union and management. Participation in the VPP also assures management commitment and employee participation for an overall positive affect to the effective implementation of a viable safety and health program across the site. Plans are underway at PGDP LMES to become a participant in the DOE VPP.

### **4.2.2 Decontamination and Environmental Restoration Activities**

#### **4.2.2.1 Project Plans**

Project plans are prepared for major decontamination and environmental restoration projects. These plans address all aspects of the project including safety and health of workers while performing the work. The plans may reference and use existing safety basis documentation or specially prepared safety and health plans.

#### **4.2.2.2 Project Health and Safety Plans**

For major decontamination and environmental restoration projects, separate safety and health plans are prepared in accordance with 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER). These plans identify vulnerabilities and the measures that will be used to mitigate the vulnerabilities.

#### **4.2.2.3 Operational Readiness Reviews**

Major decontamination and environmental restoration projects, such as the C-746-Q Cleanup, receive comprehensive operational readiness reviews. These reviews involve multiple levels of Energy Systems and DOE management and include adequacy of safety and health planning and implementation of the mitigation actions identified in the plans.

Many minor decontamination and environmental restoration projects also receive an operational readiness review which may involve multiple layers of Energy Systems and DOE management in addition to the project team. The review also includes adequacy of safety and health planning and implementation of the mitigation actions identified in the plans.

#### **4.2.3 Related Programs and Processes**

The assessment, identification and tracking of vulnerabilities is managed using the dual processes of assessing ongoing programs and managing identified deficiencies. A formal self-assessment of ongoing programs identifies continuous improvement and upon implementation will include site participation in the DOE VPP. Formal assessment programs, such as appraisals, audits, and surveillances, are used to monitor activities and provide an independent perspective in identifying vulnerabilities as issues for resolution. Each issue requires the development of corrective actions, which are tracked to completion in the Energy Systems Action Management System (ESAMS).

##### **4.2.3.1 Issues Management Process**

Issues management begins with the recognition and identification of an issue and ends with a permanent solution to the identified issue. “Issue” is a generic term for problems, deficiencies, findings, concerns, alerts, recommendations, observations, and other conditions requiring evaluation for corrective action. Elements of the Issues Management Process are identification of issues, grouping and prioritization of issues, planning of actions, performing and monitoring of actions, and verification of effectiveness.

##### **4.2.3.2 ESAMS**

PGDP LMES is an active participant in the ORR-wide issues management systems. ESAMS is a computer-based program that assures action commitment attention by tracking completion dates, issuing automatic reminders, and reporting to management on delinquent action completions. Issue actions required to be entered into the system come from audits, evaluations, as-found conditions, reviews and deficiency reporting activities. Other proactive processes, such as the USQD Program and event critiques, may also require actions, which

are then entered into the issues management database. Approximately 250 issues and corrective actions were opened in the issues management system in FY 1997. This demonstrates that problems and deficiencies are being found and corrected.

#### **4.2.3.3 Occurrence Report Investigations**

Occurrence notifications identified during facility operation come from incidents that occur during a planned activity, as-found activities that place the facility outside of the SAB, and conditions detected during normal site S&M activity. The dispositioning of occurrence notification events requires the development of corrective actions, an evaluation for root cause, and reviews for lessons learned and generic implications. These assessments go well beyond the existing condition and look at the extent of the vulnerability across the facility, site, and ORR. The Occurrence Reporting System is discussed in Section 6.

#### **4.2.3.4 Lessons Learned Review and Dissemination Process**

The Lessons Learned Program is a process by which successes, problems, and uncommon experiences are recorded for the future and are communicated across the company and the DOE Complex. The information disseminated comes from experiences of employees, DOE, other DOE contractors, and other government agencies and companies. This ensures a systematic and timely process of notifying various operating units if an experience is detected that could have significant adverse effects on quality, safety, the environment, or health. These reports often relate newly discovered vulnerabilities. The Lessons Learned program is also discussed in Section 6.

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## **5. TECHNICAL COMPETENCE**

This chapter responds to the third initiative addressed in the August 4, 1997, directive from Secretary Federico Peña, which reads as follows:

*DOE and contractor field organizations with operational responsibilities must assess the technical competence of their staffs to recognize the full range of hazards presented by the materials in their facilities, act on results, and implement training programs where needed.*

The cornerstone of safe operation at EMEF is the safety program, which includes the training of personnel performing the day-to-day functions. The goal of the training program is to efficiently and effectively conduct training that is directly related to the day-to-day functions and also meets imposed requirements to ensure that personnel are qualified.

The technical competence of health and safety personnel is a fundamental part of ensuring an effective program. At Paducah, all the health and safety staff are college graduates with a variety of technical and professional degrees. The technical competence of the staff is further ensured by individuals who possess up to 22 years of relative experience, professional certifications and licenses, multiple degrees, and extensive training.

Some certifications and licenses held by the Paducah EMEF health and safety staff include, but are not limited to: Certified Safety Professional; Certified Industrial Hygienist; Certified Hazardous Materials Manager; Certified Construction Safety and Health Technician; Licensed Kentucky Fire Suppression System Inspector; Certified Emergency Medical Technician; Certified Fire Protection Specialist; Certified Fire and Explosion Investigator; Certified Fire and Explosion Investigator Instructor; and Certified Fire Protection Engineer. The staff also maintains active membership in several professional organizations.

Responsibility for the safe operation—including training—of this organization is a line-management function. EMEF is committed to achieving performance-based training. This commitment ensures that subject matter experts and facility personnel participate in the development, review, and implementation of the training process.

### **5.1 GENERAL EMPLOYEE TRAINING**

The operating organizations at EMEF facilities are responsible for implementing training and qualification programs to ensure that employees, subcontractor personnel contracted to them, and visitors for whom they are responsible receive adequate, cost-effective training

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## Technical Competence

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commensurate with the hazard level and complexity of the operation associated with their respective job assignment. The operating organization's training staff, normally a training manager or coordinator and instructors/developers, ensure that employee training requirements are identified and documented as appropriate to their specific job. The employee's individual training program normally consists of entry-level requirements, initial job training requirements, as identified in the job/task analysis or functional analysis, and continuing training requirements to maintain qualification or proficiency.

At ETTP and PORTS, following initial employment, personnel requiring unescorted access to the site are required to attend GET. GET programs include baseline Hazardous Materials training, baseline Hazard Communications standards training, emergency response procedures, and employee reporting responsibilities training. This training is structured to meet the safety needs of each employee for access to the facilities. Examinations are administered following the completion of each segment of the GET program. Proficiency testing or refresher training and reexaminations are conducted every two years. Persons who have not completed GET or who failed the examinations are required to be under continuous escort.

At Paducah, the GET program has been in effect since before the transition. GET consists of five modules, four of which require a written examination. A minimum passing score of 80% must be achieved on each module. Upon completion of GET, the dated GET card is issued and card holders are granted unescorted access into the facility if all security requirements have been met. Refresher training is conducted every two years.

### 5.2 FACILITY- AND JOB-SPECIFIC TRAINING

Individual training plans are referred to as Baseline Training Requirements (BLTRs) at ETTP and PORTS. BLTRs have been established for personnel to match the jobs they perform to the required training; this includes training on hazards they may encounter in conducting their job activities. BLTRs were established based on analyses of the jobs including hazard and risk analyses. Training programs at Paducah EMEF were also based on analyses of jobs including hazards and have been established and implemented for key positions to ensure that Paducah staff have the competence to recognize identified facility hazards and to act safely and appropriately. These training programs are defined in position-specific Training Requirements Documents. To assist the Paducah staff in this endeavor, efforts are underway to link job hazards to tasks in a database.

Job-specific training is provided to LMES personnel through courses such as Radiological Worker training, Criticality Safety training, Safety and Health Work Permit training, etc. Facility-specific training is provided on applicable command media and hazards for specific facilities.

Job-specific training is provided based on applicable command media, specific facilities, and applicable environmental permits (e.g., RCRA permits). Some examples are (but not limited to) TSCAI, Central Neutralization Facility (CNF), Deposit Removal Project, Transportable Vitrification System facility, RCRA personnel at PORTS, and Waste Operator B training at Paducah.

The following list of training courses includes examples of courses that are provided to EMEF personnel to satisfy the requirements of their specific jobs as identified through job and task analyses:

- The Hazard Communications training course is required for unescorted access to LMES sites for more than 10 days. (ETTP and PORTS)
- Hazard Communications Level 1 training is for all workers who work with hazardous chemicals. (ETTP and PORTS)
- Hazardous Materials (DOT HM 126F) General Awareness, Familiarization and Safety training is for workers who transport small amounts of hazardous materials not in a commercial motor vehicle and/or who load, store, or secure hazardous materials for transport. (ETTP and PORTS)
- Carcinogen Control Program Training is required for workers in a carcinogen-regulated area. (ETTP and PORTS)
- The HAZWOPER 24-hour training course is required for workers in waste operations at treatment, storage, and disposal facilities regulated by 40 CFR Parts 264 and 265. (All sites)
- The HAZWOPER 16-hour training course is required if a worker has completed the 24-hour HAZWOPER training and if the worker is directly involved in RCRA corrective actions or cleanup operations and is required to wear Level C or greater personal protective equipment. (All sites)
- Training required under RCRA permits and other environmental regulations is conducted at all sites.

Some operations personnel, are required to complete position-specific training. Examples of some areas that are considered are:

- facility systems, components, and operations;
- ES&H orders;
- codes and standards overview;
- SARs and Technical Safety Requirements;
- nuclear criticality control;
- As Low as Reasonably Achievable and radioactive waste reduction program; and
- quality assurance quality control practices.

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Core training includes Radiological Worker training, Criticality Safety training, and Safety Work Permit training.

### **5.3 COMPLIANCE TO DOE ORDER 5480.20A**

EMEF has DOE–approved Training Implementation Matrices based on DOE Order 5480.20A. The current training processes and content reflect WSSs.

### **5.4 CHEMICAL HAZARDS TRAINING**

EMEF personnel are trained in hazard control methods such as the hazard diamond, how to respond to emergencies, and the use of MSDS. Personnel working with chemicals are trained in the hazard communication standards of 29 Codes of Federal Regulation 1910 and 1926. Workers working directly with chemicals are trained in the chemistry for the specific facility, including the MSDS reports for that facility.

Personnel working with chemical wastes are trained to the duties of their involvement in the waste management process. Waste coordinators determine the appropriate storage disposal method, which is communicated to the workers performing the transportation and handling of the waste. Workers are trained on the HAZWOPER training requirements per 29 CFR 1910 and on general Hazard Communication information. Through this training, workers learn to determine which wastes can and cannot be stored together and which wastes are compatible.

### **5.5 ASSESSMENT OF THE TRAINING PROGRAM**

Over the past several years, DOE has conducted a series of assessments of the technical competence of contractor staff at EMEF facilities and of site training and qualification programs.

The following are examples of assessments:

- K-25 Training Implementation Matrix for DOE Order 5480.20 by the DOE Training Coordination and Assistance Program, April 11–13, 1995 (ETTP);
- K-25 Site Training Implementation Matrix Compliance by LMES Quality and the DOE Training Coordination and Assistance Program, January 8 – 19, 1996 (ETTP);
- K-25 Site Implementation of DOE Order 5480.20A by DOE, April 1–15, 1996 (ETTP);
- Qualifications of Supervisors as part of a Type A Investigation, May 1997. (ETTP);
- Tennessee Department of Environment and Conservation audits for K-25 Site RCRA Compliance, September 1997 (ETTP);
- Management Assessment & Environment, Safety, Health, & Quality Assurance Functional Appraisal by DOE, May 10, 1995 (Paducah);



- LMES Corporate Audit by LMES, November 21, 1996 (Paducah); and
- Technical Audit of Training Program Elements of Personnel Selection, Qualification, and Training Requirements by internal assessors, June 24, 1997 (Paducah).

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## 6. LESSONS LEARNED AND OCCURRENCE REPORTING

This chapter responds to the fourth initiative addressed in the August 4, 1997, directive from Secretary Federico Peña, which reads as follows:

*DOE field offices must assess their site lessons learned and occurrence reporting programs to assure that (1) outgoing information is well characterized and properly summarized, and (2) incoming information is thoroughly evaluated, properly disseminated, appropriately implemented, and tracked through formal management systems.*

### 6.1 LESSONS LEARNED

The LMES Lessons Learned Program provides a process for identifying, disseminating, and utilizing positive and negative operating experiences that may be applicable to LMES staff. This program was implemented as a pilot in 1989 in the Engineering and Computing organizations and expanded to all areas of operation within LMES in 1991. The program was initially based on similar programs utilized within Martin Marietta (now known as Lockheed Martin) Aerospace Operations. The program has since been expanded and further defined based on the guidance contained in the DOE Technical Standard, DOE-STD-7501-95, *Development of DOE Lessons Learned Program*, which was issued in 1995. There are numerous other DOE Orders and guidance documents that reference lessons learned identification and utilization; however, no requirements are explicitly stated. The LMES Lessons Learned Program is defined in QA-331, *Lessons Learned Program*, and is integrated with other LMES programs, such as the Occurrence Reporting Program and Issues Management Program.

The overall objectives of the LMES Lessons Learned program are to capture and share good work practices and innovative approaches to promote repeat application and capture and share adverse work practices or experiences to avoid recurrence. Any LMES employee can submit information as a potential lesson learned. Additionally, several different sources of information and operating experience are reviewed and evaluated for potential lessons learned. This information is reviewed by line organizations or the Lessons Learned program managers on a regular basis. Information sources include those from within LMES, across the DOE complex, and other related technical sources. Some of the primary sources reviewed include the following:

- LMES occurrence reports;
- internal operating experiences;
- daily PSS logs of events;
- employee safety and health concerns;

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## Lessons Learned and Occurrence Reporting

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- I Care—We Care form submittals at ETTP;
- injury and illness reports;
- results of LMES audits, assessments, and investigations;
- results of performance improvement initiatives;
- readiness reviews;
- occurrences reported by other DOE facilities through the Occurrence Reporting and Processing System (ORPS);
- PAAA noncompliances (potential and actual);
- lessons learned issued by other DOE facilities;
- DOE Operating Experience Weekly Report;
- DOE Safety and Health Bulletins;
- DOE Safety Notices;
- DOE Chemical Safety Newsletter;
- DOE Accident Investigation reports;
- product recall notices;
- Consumer Product Safety Commission advisories;
- Underwriters Laboratories advisories; and
- Defense Nuclear Facility Safety Board trip reports.

The information collected from these reports and reviews is compiled as a potential lesson learned. This information is validated by a subject matter expert to ensure consistency with policies and procedures, to identify the target audience for the lesson, and to define any recommended or required actions. This review also results in the designation of a priority level to be assigned to the lesson. Guidance provided in the DOE Lessons Learned Technical Standard is used to assist in this determination. For those lessons learned that are determined to have required actions, documented responses may be required with the actions formally tracked. Lessons designated as “Red Alerts” are issued by LMES senior management and require responses from all LMES organizations.

Dissemination of lessons learned information is accomplished via several methods. LMES utilizes an electronic mail system as the primary method to disseminate lessons learned to all organizations. Recommendations and or requirements for actions associated with the lesson are included when the information is disseminated. This approach allows information to be disseminated in a short time and to a wide audience. A summary of all new lessons learned is also generated and disseminated as a paper bulletin on a periodic basis. LMES has also developed an Operating Experience Weekly Summary report. This report summarizes operating experiences from across the DOE complex that have potential applicability to LMES operations. The primary source of information for this review is ORPS. Both initial notification and final report information are included in this review. This report is widely disseminated across LMES as a paper bulletin.

Line organization managers are responsible for determining additional dissemination needs and use of the lessons learned information based on the applicability to their operations. Feedback indicates that this information is forwarded primarily via electronic mail and at safety and staff meeting reviews. This information is also placed in required reading folders, posted on bulletin boards, or summarized in internal memorandums. It is also incorporated into training and awareness programs and procedure revisions as applicable.

Historical lessons learned information is also maintained on the LMES internal-access Web server. Capabilities are provided to search and query historical lessons learned information. These capabilities allow users to search for information by the lesson priority, the functional category, or through word search. Links are also provided to other sources of lessons learned and operating experience information. Access to the lessons learned information on the Web is available to any LMES employee who has access to the LMES home page. This information has recently been electronically linked to the LMES work planning processes to allow the information to be evaluated as part of the work planning process. Enhancements are being made to expand the querying capabilities based on work activity and hazard area categories for each lesson.

Through October 1997, approximately 150 lessons learned have been documented and issued within LMES. LMES continues to evaluate all areas of operation for additional sources of lessons learned and to emphasize to all employees the importance of utilizing these experiences in their daily work and in their work and project planning. LMES has also been an active participant in DOE-wide initiatives associated with lessons learned programs. These initiatives have provided a forum for benchmarking lessons learned programs at other DOE facilities for incorporation into the LMES Lessons Learned Program.

### 6.2 OCCURRENCE REPORTING

The LMES Occurrence Reporting Program provides a process for identifying, reporting, and resolving reportable events or conditions. The LMES program is based on the requirements specified in DOE O 232.1 and DOE M 232.1-1, *Occurrence Reporting and Processing of Operations Information* and is defined in OP-301, *Occurrence Notification and Reporting*. This document specifies requirements and responsibilities of LMES staff for identification, categorization, notification, investigation, analysis, and reporting of occurrences. Additional requirements for off-site notifications are also included in this document.

The requirements stated in OP-301, define specific responsibilities for all LMES employees to report immediately to line management or the PSS Office any actual or potential adverse event or condition. The inclusion of reporting potential adverse events or conditions ensures that determinations of reportability are made by LMES management and staff who are familiar with the criteria for categorizing occurrences. This also ensures that these situations are evaluated to

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## **Lessons Learned and Occurrence Reporting**

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determine if the potential for a near-miss occurred or if they warrant reporting as a management concern.

The categorization of these events or conditions as reportable occurrences are made based on the information available at the time they are reported. The appropriate facility manager is responsible the categorization of the event or condition, with the support of PSS. Additional facility staff knowledgeable of the event or condition may be called on to support the facility manager in determining the categorization. If there are uncertainties surrounding the level of categorization, the occurrence is categorized at the highest level that may apply. The categorization is made within 2 hours of the time of discovery of the event or condition. Recent changes in the interpretation of DOE requirements on the time of discovery are being incorporated into revisions to OP-301. Guidance has been provided to communicate these changes in the interim. These changes in interpretation have provided a challenge in meeting the requirements of categorization within 2 hours of the time of discovery.

OP-301 defines the requirements for notification to LMES management, DOE and other off-site agencies and organizations on reportable occurrences. Verbal notification is accomplished, when required, via a “phone bridge” involving the DOE-HQ Emergency Operations Center, the DOE-ORO Emergency Operations Center, the responsible DOE facility representative, and the responsible LMES facility manager. The LMES PSS serves as the coordinator for these notifications. Verbal notification requirements for external agencies and organizations, such as the state emergency management agency, EPA, National Response Center, local governments, local emergency planning committees, law enforcement agencies (e.g., Tennessee Highway Patrol, Federal Bureau of Investigation), and Lockheed Martin Corporation, are also defined in OP-301 and associated guidance documents.

As part of the initial evaluation of the adverse event or condition, necessary steps are taken to secure the area and preserve any additional information as applicable. An initial review or critique to compile pertinent information is conducted as soon as possible after the event or condition is reported. This information is utilized to compile the Notification Report. The Notification Report is transmitted to ORPS by the end of the next business day (not to exceed 80 hours). Information is also captured within ESAMS to provide internal tracking of follow-up actions and responsibilities associated with resolution of the occurrence.

Follow-up or evaluation of events or conditions that are determined not to be reportable occurrences may be conducted. This determination is made by the facility manager. This follow-up may identify the need for additional actions or the development of lessons learned.

Investigation of occurrences is the responsibility of the facility manager. They have several different resources available to assist them in conducting the investigation. The facility

manager uses a graded approach in conducting the investigation. The manager may choose to conduct the investigation internally or may form a team of subject matter experts to aid in the investigation and analysis of the event. The analysis of the occurrence determines the direct, contributing, and root causes; the corrective actions; and any lessons learned associated with the event or condition. The root cause analysis may be accomplished by a variety of techniques depending on the complexity or safety significance of the event or condition. Several procedures exist within LMES to further define requirements in these areas, such as QA-312, *Issues Management Program*; QA-331, *Lessons Learned Program*; and QA-16.2, *Root Cause Analysis*. The results of this investigation and analysis are compiled in the Final Report, which is transmitted to ORPS. The Final Report and associated corrective actions are also captured in ESAMS to support internal tracking and trending needs.

Dissemination of occurrence information across LMES is accomplished through several methods. On a daily basis, a summary of all new occurrences across the DOE complex is routed electronically across LMES. LMES has also developed an Operating Experience Weekly Summary report. This document includes information on all LMES occurrences and occurrences at other DOE facilities that are potentially applicable to LMES operations. Information from both Notification and Final Reports are included in this report. This report is widely disseminated across LMES as a paper bulletin. Feedback indicates that it is used in safety meetings, pre-job briefings, and posted in work areas.

Formal training for LMES personnel concerning occurrence reporting consists of three specific courses: (1) Introduction to Occurrence Reporting, which covers the categorization criteria, the overall occurrence reporting process, and roles and responsibilities; (2) Preparation of Occurrence Reports, which covers the format of the DOE Occurrence Report and techniques for writing quality reports; and (3) Investigation Techniques, which covers best practices for investigating occurrences, interviewing skills, conducting critiques, and evidence gathering. Additional courses are also offered within LMES on Accident Investigation Techniques (DOE-led course), root cause analysis techniques (e.g., TapRoot), and corrective action planning.

DOE-ORO recently conducted a For Cause Review of the Occurrence Reporting Program at LMES Oak Ridge facilities. This review identified areas for improvement in some areas at LMES facilities related to submittal of occurrence report information. Initiatives have begun to address these concerns. Metrics have been established to monitor progress in this area. Progress on these initiatives will also be periodically reported to DOE-ORO. This review also cited a DOE-wide problem related to reporting of near-miss events. LMES staff will be participating in a forum on this topic at an upcoming DOE-wide Occurrence Reporting meeting. Additional guidance is also being developed for incorporation in revisions to OP-301.

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**Appendix A**

**SUMMARY OF IMPORTANT CORPORATE AND PGDP SITE-SPECIFIC  
PROCEDURES**

## **SUMMARY OF IMPORTANT CORPORATE AND PGDP SITE-SPECIFIC PROCEDURES**

### **A.1 ENVIRONMENTAL PROTECTION - ENERGY SYSTEMS PROCEDURES**

#### **EP-501PD, *Toxic Substances Control Act (TSCA) Compliance Program***

It is the policy of Lockheed Martin Energy Systems, Inc. (Energy Systems), to maintain an effective program to fully comply with all applicable sections of the Toxic Substances Control Act (TSCA). This program description provides Energy Systems personnel with guidelines for ensuring compliance with sections 4 (test data), 5 (premanufacture notices and significant new use requirements), 8 (reporting and recordkeeping requirements), 12 (exports), and 13 (imports).

TSCA section 6 [polychlorinated biphenyls (PCBs)] is addressed in Energy Systems standard ESS-EP-125, *Management of Polychlorinated Biphenyls (PCBs)*.

#### **ESS-EP-125, *Management of Polychlorinated Biphenyls (PCBs)***

This standard establishes the requirements for ensuring compliance with PCB regulations under Title 40 CFR 761, applicable state and local regulations for PCBs, for minimizing the risk of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and for minimizing civil liabilities.

#### **ESS-EP-126, *Spill Prevention, Control, and Countermeasures Program***

This standard defines the administrative control program established within Energy Systems to ensure that a spill prevention, control, and countermeasures program is developed and implemented in accordance with applicable federal and state regulatory requirements to prevent or minimize the potential for the discharge of harmful quantities of oil into waters of the United States or on adjoining shorelines.

#### **ESS-EP-129, *Stratospheric Ozone Protection Program***

This standard defines the Administrative Control Program established within Energy Systems to ensure compliance with the Stratospheric Ozone Protection provisions of the Clean Air Act Amendments of 1990 and to enhance planning to phase-out use of all ozone-depleting substances.

***ESS-EP-136, Resource Conservation and Recovery Act (RCRA) and Mixed Waste Program Management***

This standard defines the administrative control program that ensures that Energy Systems, in its role as RCRA cooperator, maintains compliance with the letter and spirit of all RCRA rules and permit conditions.

***EP-137, Pollution Prevention***

This procedure defines the responsibilities of the various Energy Systems organizations and sites for implementing a comprehensive pollution prevention program to minimize the toxicity and quantity of all wastes and pollutants to all media (air, water, and land), support resource and energy conservation, and implement recycling and affirmative procurement of recycled materials.

***EP-153, Identification and Reporting of Environmental Noncompliances***

This procedure establishes the roles, responsibilities, and action steps necessary to identify, report, track, correct, validate, and verify closure of environmental noncompliance issues. This procedure supplements emergency reporting and response procedures and regulatory reporting requirements; it does not replace them.

***ESP-EP-163, National Environmental Policy Act Review and Compliance***

This procedure establishes administrative controls and provides requirements for project reviews and compliance with the National Environmental Policy Act (NEPA).

***EP-710, Waste Certification Requirements for Energy Systems Waste Management Organization (ESWMO)***

This procedure provides the required actions for certifying wastes to be managed by the Energy Systems Waste Management Organization against the requirements in ES/WM-10, *Waste Acceptance Criteria for the Oak Ridge Reservation*.

***ESH-19, Commercial Management of Hazardous Materials/Wastes***

It is the policy of Energy Systems to utilize commercial firms for the off-site treatment/disposal of hazardous materials/wastes when (1) suitable on-site facilities are not available or (2) off-site facilities offer a determined economic advantage. All actions will be in accordance with regulations promulgated under RCRA and DOE Orders. All off-site waste management activities will be with firms that are licensed by federal and/or state regulatory authorities to manage the type materials or wastes under consideration.

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## **Appendix A**

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### **A.2 ENVIRONMENTAL PROTECTION - SITE LEVEL PROCEDURES**

#### **PMWM-1000, *Management of Potentially Surface Contaminated Wastes* (Supersedes IAD-1751)**

This procedure outlines the requirements for the identification and handling of potentially surface contaminated (PSC) wastes.

#### **PMWM-1001, *Identification and Management of Waste Not From a Radioactive Materials Management Area* - (Supersedes IAD-1752)**

This procedure outlines requirements for the identification and control of waste from nonradiological areas to ensure waste shipped for disposal from them has no added bulk, volume, or surface radioactive contamination.

#### **PMWM-1002-IAD, *On-Site Handling and Disposal of Waste Materials* (Supersedes ERWM/PA-I1761)**

This procedure outlines the requirements for segregating, collecting, storing, treating, and/or disposing of hazardous and nonhazardous wastes in a safe and environmentally acceptable manner at the Paducah Gaseous Diffusion Plant (PGDP). (This procedure does not include specific requirements for treatment of hazardous wastes.)

- \* Compliance will minimize the volume and hazard associated with waste materials as required by applicable Department of Energy (DOE), state of Kentucky, and federal Environmental Protection Agency (EPA) regulations.

NOTE: Additional hazardous waste handling guidelines may be found in P-ESH-186, *NCS Implementation for Handling and Storage of Fissile/Potentially Fissile Waste*, and CP2-EW-WM1032, *PGDP Alternative Hazardous Waste Handling Program*.

#### **PMWM-1005-IAD, *Polychlorinated Biphenyl (PCB) Management and Spill Cleanup***

This procedure establishes the requirements for ensuring compliance with the polychlorinated biphenyl (PCB) regulations under Title 40 Code of Federal Regulation (CFR) Part 761, applicable state and local regulations for PCBs, for minimizing risk of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and for minimizing civil liabilities.

**PMWM-1008, Tracking and Sampling Equipment/Systems Containing PCBs**

This procedure describes the requirements for tracking and sampling equipment and systems containing polychlorinated biphenyl (PCB) contamination to ensure that they are not inadvertently used or disposed based on an incorrect assumption that they were not PCB-contaminated.

**PMWM-1009-IAD, *Waste Certification Requirements for Disposing of Waste in the C-746-U Solid Waste Landfill***

This procedure will enable a waste generator to determine whether a waste is candidate for the C-746-U solid waste landfill (SWL), and if so, guide the generator through the documentation, characterization, and certification requirements necessary to meet the landfill waste acceptance criteria (WAC). The C-746-U SWL can accept non-hazardous, non-PCB, and sanitary/industrial waste which meets de minimis radiological limits.

NOTE: All potential wastestreams must be evaluated for waste minimization (recycle, reduce, or reuse) before waste generation begins.

**PMWM-1010-IAD, *Determining Need for Repackaging/Overpacking***

This procedure describes a method to determine the need for stored waste to be repackaged and/or overpacked due to container deterioration and integrity loss.

This IAD supersedes any conflicting requirements in other Paducah EMEF documents that direct response to a leaking container.

**PMWM-1050-IAD, *Waste Type Summary for Paducah DOE Waste Storage Facilities***

This procedure provides a summary of the types of wastes that may be stored at various waste storage facilities.

**ERWM/PA-I1750, *Off-Site Shipment of Hazardous, Mixed, and TSCA Wastes***

The purpose of this document is to outline the Waste Management organization responsibilities necessary to insure that all off-site shipments of Resource Conservation and Recovery Act (RCRA) hazardous, and Toxic Substance Control Act (TSCA) wastes to Treatment, Storage, or Disposal (TSD) facilities are carried out in a manner which is safe, efficient, and compliant with Federal, State, and local regulations, applicable DOE orders Martin Marietta policies/procedures and, the DOE Performance Objective for “Certification of Non-Radioactive Hazardous Waste.”

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**Appendix A**

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**ERWM/PA-I1760, *Administration and Control of Waste Materials at C-746-H3 Waste Storage Facility***

This procedure details the action steps required of the Environmental Restoration (ER) waste coordinator and support staff to implement P-ESH-165, *Handling and Storage of Waste Materials at C-746-H3 Waste Storage Facility*.

**PMEP-1001, *Stratospheric Ozone Protection Program and Recordkeeping System***

This procedure implements the requirements for controlling emissions of substances that are controlled are controlled due to their potential for depletion of the stratospheric ozone layer. This implementation is designed to provide compliance with Title VI of the Clean Air Act and its implementing regulations concerning these substances which are enforced by the United States Environmental Protection Agency (EPA).

**PMEP-1003, *Emergency Planning and Community Right-to-Know Act (EPCRA) Compliance Procedure***

This procedure describes how Paducah Lockheed Martin Energy Systems (LMES) complies with the Emergency Planning and Community Right-to-Know Act (EPCRA).

**PMWM-2000, *C-746-P1 West and C-746-P East Scrapyard Operations***

This procedure describes the preparation, handling requirements, and waste acceptance criteria for materials which are to be stored I the C-746-P1 West (Clean) and C-746-P East (Regulated) scrapyards.

**PTWM-2001, *PCB Waste Management***

The purpose of this procedure is to outline steps necessary to manage polychlorinated biphenyl (PCB) waste in accordance with all federal state regulations, TSCA FFCA Department of Energy (DOE) orders, Lockheed Martin Energy Systems, Inc., (LMES) procedures and in a safe environmentally acceptable manner.

**PTWM-2002, *Wastewater Accumulation, Storage, Treatment, and Disposal***

This procedure describes the requirements and steps to be followed for the proper handling, storage, treatment, and disposal of wastewater in DOE Management Storage Facilities to comply with State and Federal Regulations, DOE Orders, and Environmental Mange and Enrichment Facilities policies and procedures.

***PTWM-2004, RCRA Permitted Waste Storage Facilities Operations***

This procedure outlines the steps and requirements for the proper handling and storage of RCRA hazardous, PCB, mixed, low level, and nonhazardous waste materials in RCRA permitted waste storage facilities operated for DOE by Paducah Site Lockheed Martin Energy Systems (LMES).

***PTWM-2006, Inventory Control of Containerized Waste***

This procedure outlines the steps required for the proper inventorying of waste materials in waste storage facilities operated by Paducah Site Lockheed Martin Energy Systems (LMES).

***PTWM-2008, Handling and Storage of Fissionable Material - Nuclear Criticality Safety (NCS) Requirements***

The purpose of this procedure is to outline the requirements, responsibilities, and tasks for the proper handling, storage, and characterization of fissionable material.

***PTWM-2010, Handling and Storage of Low-Level Radioactive Waste***

The purpose of this procedure is to outline the requirements, responsibilities, and tasks for the proper handling, and storage of low-level radioactive waste.

***PTWM-3001, Pumping Liquid Wastes into Tankers***

This procedure provides guidelines for the proper transferring of liquid hazardous wastes from drums or tanks into a tanker trailer for shipment to an off-site treatment, storage and disposal facility (TSD).

***PTWM-4500-IAD, Standard Landfill Operations***

This procedure describes the waste delivery and maintenance operations at the C-746-U Solid Waste Landfill in compliance with regulatory requirements.

***PTWM-4501-IAD, Operation of the C-746-U Contained Landfill's Leachate Collection System***

This procedure directs operation of C-746-U landfill leachate system and equipment to properly collect, store, recirculate, sample, transfer, and dispose of leachate.

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## **Appendix A**

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### **A.3 HEALTH AND SAFETY – ENERGY SYSTEMS PROCEDURES**

#### ***SH-132PD, Hazardous Chemicals in Laboratories***

The requirements in this program description apply to the use of hazardous chemicals in laboratories on a laboratory scale whenever such use offers a reasonable potential for employee exposure. All employees, contractors, and visitors to DOE laboratory facilities operated by Energy Systems are included under the requirements of this program description.

#### ***SH-140PD, Lockheed Martin Energy Systems Hazard Communication Program***

The Energy Systems Hazard Communication Program applies to all Energy Systems employees and construction/service subcontractors who may be exposed to hazardous chemicals under normal conditions of use or in a foreseeable emergency. The Energy Systems Hazard Communication Program Description applies to all hazardous chemicals used at Energy Systems facilities, including hazardous chemicals procured and generated in the workplace, and consumer products used in quantities that exceed those of an average consumer.

The Energy Systems Hazard Communication Program Description outlines methods for communicating the potential hazards of chemicals used in the workplace to workers. These methods include employee training, container labeling, and use of Material Safety Data Sheets (MSDSs).

Awareness level hazard communication training is provided for Energy Systems employees, service subcontractors, and visitors during General Employee Training. Additional hazard communication training (Hazard Communication Level I) is provided based upon the potential for exposure to hazardous chemicals. Work area (job-specific) hazard communication training is provided by the responsible supervisor upon the employee's initial entry into the work area and whenever a new hazard is introduced into the work area.

#### ***SH-161PD, Hazardous Waste Operations and Emergency Response (HAZWOPER)***

This program description details Energy Systems actions and responsibilities needed to provide safety and health protection for individuals involved in HAZWOPER activities within the scope of 29 CFR 1910.120 and 29 CFR 1926.65

#### ***ESP-ESH-16, Hazardous Materials Inventory Program***

This procedure describes the process by which Energy Systems will provide control for hazardous materials. The Hazardous Inventory Program, which is consistent with Corporate and DOE policy and meets federal, state, and local regulations, is maintained to provide the



proper controls. The objectives of the Hazardous Materials Inventory Program are to accomplish the following:

- ensure compliance with all DOE, federal, state, and Energy Systems hazardous materials inventory regulations, orders, policies, and standards;
- minimize the potential for chemically related damage, illnesses and/or injuries in the work place and the surrounding community;
- support complimentary programs such as hazardous material transportation, hazard communication, safety, emergency preparedness, industrial hygiene, environmental compliance, non-radioactive as low as reasonably achievable (ALARA), and waste minimization;
- support optimization of hazardous materials inventory levels; and
- provide within Energy Systems a comprehensive, economical, and reliable Hazardous Materials Inventory Program strategy while minimizing the negative impact on production and research operations.

#### **SH-118INS, *Job Hazard Analysis***

This work instruction outlines uniform methods for the conduct of a job hazard analysis (JHA). This instruction applies to Energy Systems. A JHA is one of the many available ways to identify the hazards of a job and specify control measures. The JHA method outlined in this instruction is a good tool when a detailed, step-by-step analysis is needed.

### **A.4 OTHER ENERGY SYSTEMS AND SITE-LEVEL PROCEDURES**

#### **FS-101PD, *Facility Safety Program***

This program description presents the fundamental elements of the Energy Systems Facility Safety Program. Responsibilities of key personnel and organizations are delineated. These include the Director of Nuclear Safety, business unit managers, line managers, Central Engineering Services, Evaluations and Quality organizations, the Installation Facility Safety Manager (IFSM), independent review committees, and the general plant population. Key terms applied in Facility Safety are defined in this program description.

#### **PDFS-1000, *Facility Safety Program***

This program description delineates the Lockheed Martin Energy System (LMES) Environmental Management and Enrichment Facilities (EMEF) approach and responsibilities for addressing the Facility Safety program requirements at Paducah Gaseous Diffusion Plant (PGDP). This program description also addresses the relationship between the site Facility Safety program and the overall LMES program.

#### **Appendix A**

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**FS-102, *Unreviewed Safety Question Determinations***

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Once the operational boundaries and requirements are established by safety authorization basis (SAB) documents, the facility, operation, or process is maintained and operated within those boundaries and requirements. Any changes to the facility, operation, or process are evaluated to ensure that the change cannot introduce a new hazard or increase the consequences or likelihood of previously identified hazard. Conditions or properties of the facility, operation, or process which have not been identified and analyzed in SAB documents are called “as-found conditions” or “as-found properties.” These “as-found” conditions or properties are analyzed to determine their impacts on the safety of the facility, operation, or process.

FS-102 establishes the requirements and methods for evaluating changes to facilities and as-found conditions in facilities that have been identified as “nuclear facilities” or “hazardous facilities.” FS-102 provides a systematic method for evaluating new proposed activities, processes, or situations to decide if the current authorization basis will remain valid or if DOE approval is required before making the change.

**FS-103PD, *Safety Documentation***

This program description identifies the safety documentation requirements for compliance with DOE Orders 5481.1B, 5480.21, 5480.22, 5480.23, and Occupational Safety and Health Administration standard 29 CFR 1910.119. This procedure provides a description of the various types of safety documentation and brief guidance on what types of facilities, operations, or activities require safety documentation.

**PDFS-1001, *Unreviewed Safety Question Determinations***

This program description delineates the Paducah Site approach for determining whether proposed changes, tests, experiments, and as-found condition could result in a facility being outside its authorization basis.

The Unreviewed Safety Question Determination (USQD) process, although closely related to safety analysis, is not equivalent to determining all elements of safety for a change. This process is documented by the completion of a Preliminary Safety Evaluation (PSE) or a Safety Evaluation (SE).

This program description implements Department of Energy (DOE) Order 5480.21, *Unreviewed Safety Questions (USQs)*.

**Appendix A**

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**ESP-ESH-16 IAD, *Hazardous Materials Inventory Program***

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This revision is issued as an Immediate Action Directive (IAD) to be attached to and a part of ESP-ESH-16, *Hazardous Materials Inventory System*, dated March 15, 1991. This revision included guidelines for non-Energy Systems facility involvement in the Hazardous Materials Inventory Program. If an affected organization cannot implement this IAD immediately, the affected organization shall establish an implementation plan and schedule.

**ESS-FP-102, *Handling Small Quantities of Flammable/Combustible Liquids***

This standard establishes requirements for the handling and storage of small quantities of flammable and combustible liquids by Energy Systems.

**FP-105PD, *Fire Protection Program***

The Lockheed Martin Energy Systems Fire Protection Program applies to federally-owned Energy Systems operated facilities. This document provides guidance for complying with DOE Orders, criteria, guides, and mandated fire protection codes and standards. The primary purpose of the program is to prevent the occurrence of fire, minimize the potential for an unacceptable loss, and provide protection for employees, the environment, and DOE property.

**FP-121, *Fire Protection Assessment Program***

This procedure establishes requirements for conducting fire protection assessments of Energy Systems-operated facilities.

**PMFP-1001-END, *Fire Protection Program***

This procedure was recently deleted and replaced by Paducah EMEF Fire Protection Manual which outlines the PGDP LMES Fire Protection Program and includes direction for PGDP LMES fire protection systems and control and storage of flammable/combustible liquids.

**PMFP-1002-END, *Fire Protection Systems***

This procedure was recently deleted and replaced by Paducah EMEF Fire Protection Manual which outlines the PGDP LMES Fire Protection Program and includes direction for PGDP LMES fire protection systems and control and storage of flammable/combustible liquids.

**Appendix A**

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**PMFP-1003-END, *Control of Flammable/Combustible Liquids***

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This procedure was recently deleted and replaced by Paducah EMEF Fire Protection Manual which outlines the PGDP LMES Fire Protection Program and includes direction for PGDP LMES fire protection systems and control and storage of flammable/combustible liquids.

**PMFP-1004-END, *Flammable/Combustible Liquid Storage Cabinets***

This procedure was recently deleted and replaced by Paducah EMEF Fire Protection Manual which outlines the PGDP LMES Fire Protection Program and includes direction for PGDP LMES fire protection systems and control and storage of flammable/combustible liquids.

**MS-102PD, *Integrated Safety Management Program***

This document describes the approach used by Energy Systems to systematically integrate safety (as used synonymously with environment, safety, and health) into management and work practices so that missions are accomplished while protecting the public, the workers, and the environment. Continued improvement of existing systems and processes provides the foundation for performing work safely at all Energy Systems work locations. The Energy Systems Integrated Safety Management System fully embodies the basic concepts of integrated safety management contained in DOE policy *Safety Management System Policy* (DOE P 450.4).

**PTER-2001, *Environmental Restoration Facility Walkthroughs***

This procedure describes the frequency and methods of facility walkthroughs for all facilities and areas owned, operated, or managed by the Environmental Restoration (ER) Division. The procedure is written to establish walkthrough schedules for the facilities and areas, and to ensure consistency in the purpose and conduct of the walkthroughs.

**PMEM-1000, *Emergency Management Program Administration***

This procedure describes the requirements for administering the Emergency Management Program, ensuring the program meets established requirements and company commitments.

**PMEM-1002, *Emergency Accountability***

This procedure provides policy and framework for obtaining a prompt and accurate accountability of personnel during an emergency accountability.

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**PMEM-1003, *Emergency Operations Center Activities***

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This procedure describes the emergency response activities for emergency response personnel in the Paducah Site Emergency Operations Center (EOC) during an alert or a site area emergency.

**PMEM-1004, *LMES/DOE Emergency Public Information***

This procedure established guidelines for providing information to the news media and the public during emergency conditions involving Department of Energy (DOE)/DOE contractor personnel, facilities and/or activities for which the Emergency Operations Center (EOC) would be activated.

**PMEM-1005, *Recovery from Emergencies***

This procedure provides general guidance for recovery planning and recovery operations during an emergency involving DOE facilities/areas at the Paducah site reservation.

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**Appendix B**

**ADDITIONAL INFORMATION ON SITE OPERATIONS PRACTICES**

## **Appendix B**

### **ADDITIONAL INFORMATION ON SITE OPERATIONS PRACTICES**

#### **B.1 CONDUCT OF OPERATIONS**

Site Operations facilities use the Conduct of Operations Program to ensure safe operations in day-to-day facility activities. All work activities are performed in a controlled manner in accordance with Lockheed Martin Energy Systems procedures and applicable permit requirements, and through the use of operational procedures for routine activities and approved work instructions for non-routine activities. For work not covered by existing procedures, the Safety Work Permit Program is used to ensure that proper controls (e.g., permits for lockout/tagout, hotwork, electrical work, etc.) and proper planning and orientation have occurred.

Site Operations facilities use a common procedure, *Configuration Management Program*, PMCM-1000 to ensure that the proper change control process is followed for operational and facility changes. The change control process ensures that changes (whether permanent or temporary, physical or operational) are properly identified, developed, technically reviewed, approved, scheduled, implemented, validated, and documented, and that all command media elements (procedures, drawings, reports, designs, etc.) affected by the change are identified and updated according to an approved change control process. Also, any changes or modifications to the facility are first evaluated using, FDFS-1001, *Unreviewed Safety Questions Determinations*, to ensure that the proposed modifications are not introducing new hazards into the workplace.

The activities associated with Site Operations facilities involve working with or around hazardous chemicals and processes. Site-wide programs and organizations, such as Emergency Management and Radiation Protection, are used in conjunction with Site Operations programs and procedures to ensure that safe work practices are conducted for all activities. The Facility Safety Management Program assists in identifying and documenting the pertinent hazards for a process or facility as well as establishing controls or operational limits to ensure safe operations. The Conduct of Training Program ensures that tasks are being performed by qualified workers and that the workers have been trained on the hazards associated with a particular work area. The Conduct of Operations Program implements safe work practices in day-to-day operations and ensures that configuration control is implemented for facility and operational changes. All of these primary and supporting programs are used to ensure that accidents, such as fires, explosions and the release of hazardous materials, do not occur at PGDP LMES.



## **B.2 OPERATIONAL READINESS REVIEWS**

Major and many minor decontamination and environmental restoration projects receive an operational readiness review which may involve multiple layers of Energy Systems and DOE management in addition to the project team. The review includes adequacy of safety and health planning and implementation of the mitigation actions identified in the plans. Currently, all drum opening activities requires an operational readiness review.

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**Appendix C**  
**PERFORMANCE INDICATORS**

**Appendix C****PERFORMANCE INDICATORS****C.1. GENERAL**

Performance indicators are used to monitor progress toward eliminating or reducing hazards associated with potential vulnerabilities at the Paducah Gaseous Diffusion Plant (PGDP) Lockheed Martin Energy Systems, Inc. (LMES). For example, the quantity of waste managed by Department of Energy (DOE) facilities. A performance indicator has been developed to track the quantity of waste stored in DOE facilities, to project storage accommodations, and to reflect the reduction of this waste through disposal and/or treatment.

**C.2. SAMPLE INDICATORS**

Given below is a listing of the sample indicator charts and a description of the indicator as related to vulnerabilities being addressed:

Indicator	Purpose
Routine Storage Operations Sampling	Monitor the amount of samples characterized and sampled each month
Resource Conservation and Recovery Act (RCRA)/Toxic Substance Control Act (TSCA) Waste to Toxic Substance Control Act Incinerator (TSCAI)	Monitor PCB & RCRA waste shipped to East Tennessee Technology Park (ETTP) TSCAI for disposal
Waste Stored in DOE Facilities	Monitor the quantity of waste stored in DOE facilities, to project storage accommodations, and to reflect the reduction of waste through disposal and/or treatment

**Appendix D**

**STATUS OF KNOWN VULNERABILITIES**

*(This appendix was provided to DOE-ORO on November 17, 1997; therefore, it is not included in this draft report.)*